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BOTANICAL ABSTRACTS

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ENTRIES 1-218

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

1. [ANONYMOUS.] **Milwaukee Public Museum.** Museum Work 1: 101. Jan. 1919.—Botanical exhibit, opened to public in Oct., 1918, contains systematic collection of fungi, mainly mushrooms from Wisconsin, both dried and wet preparations, and 50 groups of wax casts of fleshy fungi; a considerable series of exhibits of economic botany, from crude products to manufactured articles, ultimately to be arranged by botanical families; 54 models of entire plants, each representing a distinct family; numerous enlarged models of parts; 37 garden vegetables. Also a series of ten "war garden" vegetables, illustrating their more common fungus and insect pests, with labels giving directions for treatment; a perennial cut flower exhibit of wild and cultivated plants.—*C. Stuart Gager.*

2. MINER, RALPH WALDO. **Educational training of museum instructors.** Museum Work 1: 114-117. Jan., 1919.—A pedagogical training is of great assistance to a museum instructor who has had a course of training in actual practice of the museum, and who also possesses natural qualities of enthusiasm, tact, and personality. Discussions by Alice W. Kendall, Louise Connolly and Gertrude Underhill, all emphasizing necessity of pedagogical training for museum docents.—*C. Stuart Gager.*

3. REA, PAUL M., AND AGNES L. VAUGHAN. **The development of museum instruction What American museums are doing.** Museum Work 1: 109-113. Jan., 1919.—Paper read at museum instructors session of American Assoc. of Museums, May, 1918. Gives outline of educational activities, (in addition to public exhibits) of Amer. Museum Nat. Hist. (New York City), Arnot Art Gallery (Elmira, N. Y.), Boston (Mass.) Museum of Fine Arts, Children's Museum (Boston), Cleveland (Ohio) Museum of Art, John Herron Art Institute (Indianapolis, Indiana), Metropolitan Museum of Art (New York City), Newark (N. J.) Museum, Park Museum (Providence, R. I.), San Diego (Calif.) Museum, Syracuse (N. Y.) Museum of Fine Arts, and New Jersey State Museum (Trenton).—*C. Stuart Gager.*

4. ROWE, L. EARLE. **Practical training of museum instructors.** Museum Work 1: 122-126. Jan., 1919. Discussions by Deborah Kallen and Edith R. Abbott.—*C. Stuart Gager.*

5. VAUGHAN, AGNES L. **Special training of museum instructors.** Museum Work 1: 118-122. Jan., 1919.—Histrionic training in posture, voice, gesture desirable. Discussions by Ann E. Thomas and Eva W. Magoon.—*C. Stuart Gager.*

ECOLOGY AND PLANT GEOGRAPHY

H. C. Cowles, *Editor*

6. Baker, Frederick S. **Aspen as a temporary forest type.** Jour. Forestry 16: 294–303. *3 fig.* Mar., 1918.—The author's studies were undertaken largely to test the recently expressed view of Fetherolf that the aspen (*Populus tremuloides*) is a permanent rather than a temporary forest type in the Great Basin. It is admitted that many stands are not ephemeral, but it is concluded that "there is no evidence that the aspen by itself or by means of associated fungi and biotic factors is able to withstand invasion by white fir or Douglas fir." Its prominence must be accounted for by repeated fires, which have eliminated conifers and favored aspens, because the latter exhibit sprout reproduction. Thus the aspen is a temporary or successional type in the Great Basin as elsewhere. [See also Bot. Absts. 1, Entry 252.]—*H. C. Cowles.*

7. Bews, J. W. **The grasses and grasslands of South Africa.** *15 × 22 cm., vi. + 161 p. 24 fig., 1 map.* Davis & Sons: Pietermaritzburg. 1918. ($2.00.)—The first part of the volume is devoted to a series of keys for the identification of the 500 species of grasses which form so conspicuous a portion of the flora. In the remainder of the book are discussed; (1) the sources of the structural and ecological characteristics of the principal species; (2) the general character of the grasslands and the development of the various association types and, (3) the economic application of the ecological principles involved. There are types comparable to the "short grass," "wire grass" and prairie grass of North America, as well as a tall, coarse *Andropogon* association (this last developing upon potential woodland areas) and a mountain tussock grassland. The discussion of the successional relations of these and other association types into which grasses enter, gives a comprehensive general sketch of the plant communities of the major portion of South Africa.—In the final chapter the feeding value of the different types of grassland as well as the comparative merits of native and introduced species is discussed. The effect upon the productivity of various types of grassland by various kinds of grazing and the results from grass burning are considered, and some of the ecological problems involved are pointed out. An appendix contains a list of English, Dutch, Zulu and Sesuto names of the more important species.—*Geo. D. Fuller.*

8. Bouyoucos, George J., and M. M. McCool. **Determining the absolute salt content of soils by means of the freezing-point method.**—Jour. Agric. Res. 15: 331–336. Nov., 1918.—When the soil is approximately saturated with water the freezing point was found to afford an indirect means of measuring the salt contents of the soil.—*H. L. Shantz.*

9. Drude, O. **Licht- und Wärmestrahlung als ökologische Standortsfaktoren. [Light and heat irradiation as ecological factors.]** Flora 111, 112: 227–267. *2 fig.* 1918.—The major portion of the article is occupied with a critical discussion of the theories concerning the relation of heat-rays and light-rays to the structure of the leaf and to the ecology of the plant. Author believes that those structures, especially in the leaf, which are characteristic of plants of xerophytic formations are to be regarded as a protection against too great heat absorption and the accompanying high transpiration, while the assimilation in leaves thus protected is favored by the solar irradiation and would not reach the optimum in diffuse light. He supports his views by a limited number of heat measurements made with ordinary thermometer, black-bulb thermometer, and black-bulb thermometer *in vacuo* at altitudes of 1100–1200 m., where the temperatures in fully insolated tufts of low plants may exceed the temperature *in vacuo* and be as much as 37° above the temperature of the air. Even slight differences of exposure, such as the shade of a rock, may offset completely the effect of insolation and account for the radically different vegetation in such locations. At timber-line the trees may live in temperatures as high as 25° or 30° and the grasses as high as 40° even in September, which may account for the high altitudes reached by certain low-growing ruderal species.

Author did not attempt to measure the actual internal temperature of such plants. He develops a formula for determining the effective maximum temperatures for insolated plants by subtracting the black-bulb temperature from the temperature *in vacuo*, multiplying it by the percentage of sunshine and adding the result to the black-bulb temperature. Averaging this with the nocturnal minimum gives the daily mean, which is found to be (for five days in June) 6° higher than the usual figure.—*H. A. Gleason.*

10. Elmore, C. J. **Changing diatoms of Devil's Lake [North Dakota].** Bot. Gaz. **65:** 186–190. Feb., 1918.—The author discusses the phenomenon of the changing diatoms of Devil's Lake, North Dakota, and the smaller lakes in its vicinity. These small lakes were formerly part of the main lake but have been separated from it by the lowering of the water. Devil's Lake, which was formerly a fresh-water lake fed by streams is passing through a rapid transition. The water is becoming salt, however the salinity differs from that of the sea. It also differs somewhat in different parts of the lake and at different seasons of the year. Of the 56 species of diatoms identified by the author, 25 are genuine fresh-water species; 20 are found in fresh or brackish water; 2 in fresh, brackish, or salt-water; 2 in brackish or salt-water; and 4 marine. The presence of the marine species may be due to importation by migratory birds. The 25 fresh-water species present the greatest anomaly for there is nothing in their appearance to indicate that they have been modified by the change in environment. This fact would seem to confirm what has been observed elsewhere that many diatoms adapt themselves readily to changes in environment.—*Elizabeth Dorothy Wuist Brown.*

11. Emoto, Y. **On the relative efficiencies of cross and self fertilization in some plants.** [Title in English, text in Japanese.] Bot. Mag. Tôkyô **32:** 153–186. *2 fig.* June, 1918.—Results of fertilization in flowering plants are markedly different according to mode of pollination. Materials used were selected from the most common cultivated plants of Japan, belonging to Cruciferae, Iridaceae, Liliaceae and Primulacae. Usually results (size of fruit, weight of seed etc.) are best when different individuals share in cross fertilization although in *Tritonia aurea*, fertilization by pollen of the same individual results in greater percentage of fertilized flowers than when fertilization is by pollen of another individual. Self fertilization sometimes brings good results for length of fruit in *Primula obconica* and for weight of seed in *Brassica campestris*, *Hyacinthus orientalis*, *Freesia Leichthini* and *Tritonia aurea*. In *Primula sinensis*, fruits produced by flowers having long stamens when pollinated by flowers with short stamens are better in size and weight of seed than either those produced by flowers of the latter when pollinated by the former, or those produced by crossing the same kind of flowers.—*K. Morita.*

12. Jeffreys, Harold. **On the rarity of certain heath plants in Breckland.** Jour. Ecol. **6:** 226–229. Nov., 1918.—The author records the result of an experiment in the transfer of *Nardus stricta*, *Deschampsia flexuosa* and *Molina coerulea*, plants common to most of the heaths of England, to the more exposed and more xerophytic conditions of the Breckland heath of Suffolk. Plants transferred to the drier areas proved incapable of surviving but *Nardus* and *Molina* appeared to be quite able to hold their own upon damper parts of the same heath when they were protected from the attacks of rabbits.—*Geo. D. Fuller.*

13. Moore, George T. **Algological notes: III. A wood-penetrating alga, Gomontia lignicola, n. sp.** Ann. Missouri Bot. Gard. **5:** 211–224. *Pl. 13–15.* 1918.—See Bot. Absts. 1, Entry 766.

14. Setchell, W. A. **Parasitism among the red algae.** Proc. Amer. Phil. Soc. **57:** 155–172. 1918.—See Bot. Absts. 1, Entries 767, 1376.

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

15. Birch, D. C. **Extra costs of logging National Forest stumpage.** Jour. Forestry **16:** 909–914. December, 1918.—The extra expense in logging government stumpage is due to "(1) increased construction cost; (2) extra care in felling, bucking, yarding; (3) felling snags and diseased trees; (4) disposal of snags and brush; (5) fire-protective requirements." Time studies gave the costs of these operations as $0.855 per thousand which is greater than the cost of private logging. Offsetting this is a cost of $0.78 due to better quality timber and saving in felling and bucking, and in fire protective measures or a net increase in cost of $0.075 per thousand.—*E. N. Munns.*

16. Brewster, D. R. **Relation between height growth of larch seedlings and weather conditions.** Jour. Forestry **16:** 861–870.—Data on 112 larch trees in Idaho covering 22 years show the height growth in 1914 to be above the average. Comparisons of growth with the weather records show this growing season to have had more than the average number of clear days, a mean temperature slightly higher than the average and gentle showers well distributed through the growing season. This may be the reason for the greater growth.—*E. N. Munns.*

17. Hutchinson, A. H. **Limiting factors in relation to specific ranges of tolerance of forest trees.** Bot. Gaz. **66:** 465–493. *7 fig.* Dec., 1918.—The range of forest trees in Canada is correlated with available information on soil and climate. No quantitative data are given. Temperature, moisture and soil are regarded as the factors most commonly limiting the distribution of trees; but it is shown in a number of specific cases that other factors, such as light, competition, and the time element may be of great importance. Thus, the southern range of *Abies balsamea* is sometimes determined by competition with *Acer* and *Tsuga. Larix americana* is often forced by competing species into habitats which they are unable to occupy. This is generally true of species having a wide range. That the northern range of trees is not always determined by temperature is shown by the fact that the lines marking the northern range of a number of species are intersected by isotherms. Some 13 species are discussed in more or less detail.—*G. A. Pearson.*

18. Sampson, Arthur W., and Weyl, Leon H. **Range preservation and its relation to erosion control on western grazing lands.** U. S. Dept. Agric. Bull. 675. *35 p.* 1918.—A study of the relationship between range preservation and erosion was made on the Manti Forest in Utah by comparing the run-off and the erosion from two areas. The two most important factors were found to be the melting of snow and the summer rains. The run-off from melting snow causes severe erosion when the cover is sparse and the slopes steep, and run-off and erosion varies in intensity with the climatic factors, temperature being most important. Most rapid snow melting and most severe erosion occur where there is a lack of vegetation. With rainfall, the extent of erosion and run-off depends on the rate at which rain falls, the steepness of slope, the presence of established gullies, the character of the soil, and the density and character of the vegetation.—Studies of plant growth brought out that erosion is detrimental to plant growth because of lack of adequate soil moisture and lack of plant nutrients due to the reduction of soluble plant foods. On eroded soil, a new series of succession takes place and to reestablish the more desirable and permanent species as occupied the soil before depletion requires years of time and good range management.—The amount of organic matter affects greatly the water-holding capacity and is shown in the little erosion from fully vegetated lands except during intense rainfall or prolonged heavy rain, and then erosion is not serious. Denuded or sparsely vegetated slopes may after small storms have both run-off and erosion.—General observations show moderate sheep grazing on sparsely vegetated range increases the run-off and erosion when the physical factors are favorable to erosion and where erosion is already in the incipient stage. The seriousness of erosion is largely determined by the extent to which ground cover is maintained and this cover may be

destroyed and serious damage result from overgrazing or mismanagement of stock. Deferred and rotation grazing should be practiced and the stock kept under control at all times with slight changes as erosion becomes manifest. With erosion once under way, mechanical methods are necessary to assist nature.—*E. N. Munns.*

19. SAMPSON, ARTHUR W. **Effect of grazing upon aspen reproduction.** U. S. Dept. Agric. Bull. 741. Feb., 1919.—The injury and mortality chargeable to the presence of live stock is roughly proportional to the closeness to which the lands are grazed. Observations covering a five-year period in standing timber on sheep range showed that 27.2 per cent of the reproduction was either injured or killed on lightly grazed plots, 31.8 per cent on moderately grazed areas, and 65 per cent on heavily grazed plots. A large proportion of the nonbrowsed sprouts are killed by causes other than grazing. In standing timber on cattle ranges also the injury varied according to grazing intensity, but was less than on the sheep range. During 1915 and 1916 the average percentage of injured and killed sprouts by cattle browsing was 1.6, 2.4, and 26.8 on lightly, moderately, and heavily grazed plots, respectively.—On clear-cut lands, where the reproduction is conspicuous and the stand even, the annual mortality due to sheep grazing is exceedingly heavy. As a rule three years of successive sheep grazing on such lands results in the destruction of the entire stand. Some injury is also caused by cattle on clear-cut areas, but unless the range is stocked with cattle beyond its normal carrying capacity there is little danger of the reproduction being destroyed beyond the requirements necessary for the establishment of a full commercial stand.—A comparison of the character and intensity of browsing shows that a notably greater proportion of the woody stems is consumed by sheep than by cattle. Even in the autumn after the leaves have dropped sheep devour a considerable quantity of the stems of a single season's growth regardless of the presence of an abundance of choice forage. In the case of cattle, however, the naked stems are practically untouched.—On lands protected from grazing aspen sprouts are produced only during the first two seasons after cutting. On grazed lands a considerable number of sprouts are sent up for three successive seasons following the removal of the timber. The third year's reproduction, however, appears from two to five weeks later than that produced in the two previous seasons and is, for the most part, eliminated shortly after its appearance by adverse climatic factors, chiefly frost.—A surprisingly large proportion of the reproduction produced even on the most favorable sites is killed during the first three years of its growth by causes other than grazing. Frost and bark-eating mammals, notably gophers, field mice, and rabbits, are mainly responsible for such mortality. Much of the damage caused by gophers and mice is done under the snow during winter or early spring.—The annual rate of height increment of the aspen reproduction averages about 15 inches. Hence sprouts 3 years of age are exempt from serious injury by sheep, and those from 4 to 5 years of age are free from serious injury by cattle.—Aspen is practically unable to reproduce under its own shade and the best means of obtaining vigorous and dense reproduction, and at the same time of harvesting the timber economically, is to clear-cut the lands or to thin the stand heavily. [See Bot. Absts. 2, Entry 227.]—*G. A. Pearson.*

GENETICS

GEORGE H. SHULL, *Editor*

20. BAUR, E. [Rev. of: SIEMENS, H. W. **Die biologischen Grundlagen der Rassenhygiene und der Bevölkerungspolitik. [The biological foundations of race-hygiene and of eugenical policy.]** *8vo, 80 p., 8 fig.* J. F. Lehmann: München, 1917.] Zeitschr. indukt. Abstamm. Vererb. 19: 312. Aug., 1918.—See Bot. Absts. 2, Entry 387.

21. BAUR, E. [Rev. of: SIEMENS, H. W. **Biologische Terminologie und rassen-hygienische Propaganda. [Biological terminology and eugenical propaganda.]** Arch. Rass. u. Ges. Biol. 1917: 257. 1917.] Zeitschr. indukt. Abstamm. Vererb. 19: 311–312. Aug., 1918.—See Bot. Absts. 2, Entry 388.

22. Bergström, Sverker. **Sur les moments de la fonction de correlation normale de *n* variables. [On the moments of the function of normal correlation of *n* variables.]** Biometrika 12: 177–188. Nov., 1918.—Demonstrates a simple general formula for calculating the product-moment of any number of variables, distributions of which are in accordance with normal probability curve. The equation follows:

$$M\ [x_1x_2x_3\ .\ .\ .\ x_{2k}] = S\ r_{1,2}\ r_{3,4}\ .\ .\ .\ r_{2k},r_{2k}.$$

Left-hand expression means the product moment of variables x_1, x_2, etc., each measured in terms of its standard deviation. Right-hand expression means sum of products of the correlations in all groups which can be made so as to involve each variable once and only once. As many of the variables, however, may be identical, as may be desired. The following are examples:

$$M\ (xyzw) = r_{xy}r_{zw} + r_{xz}r_{yw} + r_{xw}r_{yz};$$
$$M\ (xyz^2) = r_{xy} + 2r_{xz}r_{yz}.$$

Product-moment of an odd number of variables is zero.—*Sewall Wright.*

23. Detlefsen, J. A., and E. Roberts. **On a back cross in mice involving three allelomorphic pairs of characters.** Genetics 3: 573–598. Nov., 1918.

24. East, E. M., and J. B. Park. **Studies on self-sterility. II. Pollen-tube growth.** Genetics 3: 353–366. *3 fig.* July, 1918.—Author has found that cross and self sterility in certain Nicotianas is due to slow growth of pollen tubes. Pollen tubes of *Nicotiana alata*, *N. angustifolia*, *N. glutinosa*, and *N. Forgetiana* grew well on artificial media, but best on 2 per cent agar plus 20 per cent cane sugar. Maximum length attained was 0.6 mm., usual length being .1–.2 mm. Growth starts slowly, reaching maximum rate in 12–24 hours, and then declines. This is quite unlike growth of tubes in styles, where growth is continuous and rate either remains constant or is regularly accelerated. Numerous attempts failed to indicate that chemical substances in stigmas, styles and ovaries have directive influence on pollen tubes or that there is greater effect of such substances in styles where fertilization is possible, than in styles of "incompatible" plants, but there was unmistakable evidence that presence of gynaecium parts promotes pollen-tube growth. Failure to show directive influence may have been due to too rapid diffusion of chemical stimulants. Attempts to produce self-fertilization in self-sterile plants by pollination of mutilated styles seem to have succeeded in two cases. Pollen germinates as well on "incompatible" stigmas as on "compatible," and 5–10 times as many tubes are produced as are required to fertilize all the ovules.—Microscopical study of styles at definite intervals after pollination showed that, in case of self-pollination and in "incompatible" crosses, pollen-tube growth proceeds at constant rate (average 18 mm. in eight days), while in "compatible" crosses growth starts at approximately the same rate, but rate is accelerated in manner suggestive of autocatalytic reaction. In cases diagrammed fertilization took place in four to five days, total length of styles traversed being 34 to 36 mm. Toward end of flowering season rate of growth of self pollen tubes, or in incompatible crosses, becomes more rapid, but there is little evidence of acceleration during their passage down the style.—Author thinks evidence indicates that there is no inhibition of development of pollen tubes in self-fertilization or in incompatible crosses; but that, in compatible crosses, stimulative substances are secreted by pistil owing to presence of catalyzer produced by pollen-tube nucleus, this catalyzer being produced because in certain specific hereditary factors, plant which produced the pollen differed from plant on which the pollen was placed.—Greater growth of self tubes at end of season is attributed to unrelated phenomenon, namely, parasitism of pollen tube on the now less resistant cells of the pistil.—*Geo. H. Shull.*

25. Embody, G. C. **Artificial hybrids between pike and pickerel.** Jour. Heredity 9: 253–256. *Fig. 4–5.* Oct., 1918.—Occasional finding of wild type fishes in Lake Cayuga, that are intermediate in some respects between northern pike (*Esox lucius*) and pickerel (*Esox reticulatus*) suggested that they might be natural hybrids. Author studied spawning behavior of the two species and found that their spawning seasons overlap and that there was

possibility of chance crossing. He also artificially crossed the two species and was able to rear a few specimens, three of which, at six months after hatching, measured, respectively, 15.2, 13.8 and 9.1 cm. Photographs and descriptions of these specimens indicate that they are intermediate with respect to scalation of cheeks; while in color pattern that of pike is dominant, at least in juvenile stages. It would be interesting to go beyond the F_1 generation, but this has not as yet been accomplished.—*H. H. Newman.*

26. FEDERLEY, HARRY. Zeitschr. indukt. Abstamm. Vererb. 19: 210. June, 1918. [Review of: TANAKA, YOSHIMARO. **Genetic studies on the silkworm.** Jour. College Agric. Sapporo 7: 129–255. *Pl. 1–4.* 1916.]—Reviewer notes that Tanaka in this article summarizes his previous work on silk worms, listing 12 factors, 9 of which influence coloration, markings, and skin-structure, of the caterpillar, 1 the number of moults, and 2 color of cocoons. Only in one case is linkage complete in both sexes, in others it is complete (no crossing over) in female, partial in male. Greater number of independent characters than in Drosophila, is related to fact that *Bombyx* has 28 chromosomes. Reviewer expresses view that reversal of linkage relations with regard to sexes, as compared with *Drosophila*, is due to fact that in *Bombyx* the female is heterozygous while in *Drosophila* male is heterozygous.—*Geo. H. Shull.*

27. HARPER, R. A. **Organization, reproduction and inheritance in Pediastrum.** Proc. Amer. Phil. Soc. 57: 375–439. *Pl. 5–6, 35 fig.* 1918.—*Pediastrum* is regarded as exceptionally valuable material for study of various problems, involving origin, heredity, modification and interrelation of characters, because of its simple organization and its inter-specific variability as regards structural characteristics. This study, being one of a series, deals mainly with two species, *P. Boryanum* Kg. and *P. asperum.* Life histories of each are described and compared in great detail with special reference to origin, development and heredity of such characters as spacial interrelation of cells in colony, green color, and shape of cell. Results from statistical studies of certain types of characters are given and discussed. Number of cells in colony tends to be inherited, though fluctuating variability is very marked. Four-lobed cell character is strictly inherited though suggestion is made that the environmental complex may have led in successive generations to development of this four-lobed form and its subsequent hereditary fixation—in other words, the inheritance of an acquired character. Shape and position of the two types of lobe are also strictly inherited, though modified by changes in environmental complex. Cell form determines colony form. Three degrees of directness in hereditary transmission of Pediastrum characters—(1) direct transmission by division of cell character, as green color by chloroplasts; (2) somewhat indirect transmission of adult cell characters, not visible as such in germ cell (lobed cell form); (3) entirely indirect transmission of colony characters (arrangement of cells). Characters of cells are of two distinct categories, metidentical (green plastid color), and characters dependent on organism as a whole (cell form). Neither type necessitates assumption of hereditary factors in a specialized germ plasm to account for their transmission. Form of colony is typical in proportion to vigor of swarm spores at time of colony organization. [See Bot. Absts. 2, Entry 60.]—*O. E. White.*

28. HARRIS, J. ARTHUR. **Further illustrations of the applicability of a coefficient measuring the correlation between a variable and the deviation of a dependent variable from its probable value.** Genetics 3: 328–352. *6 diagrams.* July, 1918.—Usefulness of method proposed by author some years ago is here illustrated by application to ten cases taken from literature, as follows: (1) Proportionality of parts in *Paramecium* (Jennings). Confirms conclusions of Jennings and adds that when *Paramecium* varies in length, both anterior and posterior fractions of body contribute to this variation, but as total length increases, anterior portion becomes relatively shorter. (2) Absence of relationship between size of litter and sex in swine (Parker and Bullard). Confirms conclusions drawn from percentage tables by authors cited. (3) Proportion of pistillate and hermaphrodite flowers in the inflorescence of the composite *Homogyne* (Ludwig). In larger heads purely pistillate flowers are relatively less numerous and hermaphrodite flowers relatively more numerous. (4) Fertility of capsules

and viability of seed in carnation crosses (Stuart). Results are inconclusive because of small amount of data, but there is some indication that there is relatively higher failure to germinate among seeds produced many in a capsule. (5) Relationship between total number of pedicels and number of abnormal pedicels in *Spiraea Vanhouttei* (Harris). Larger inflorescences have relatively smaller proportion of abnormal pedicels; relative number of abnormal pedicels decreases as total number of abnormal pedicels increases; results are consistent but degree of correlation is slight. (6) Interrelation of cotyledons and primordial leaves in a race of *Phaseolus vulgaris* highly variable in seedling characters (Harris). When total number of leaf homologs increases, the increase is due to far greater extent to increase in number of primordial leaves than to increase in number of cotyledons. (7) Changes in proportion of parts in developing trout (Jenkinson). Correlation between head length and total length is approximately same at all stages ($r = 0.72$ to 0.94), but correlation between total length and deviation of head length from its probable value, changes from $r = +0.65$ in first stage through $r = 0.00 \pm$ in third stage, to $r = -0.53$ in fifth stage. (8) Relation between total solids and sucrose content in juice of sugar beets. Juice with higher total solids contains both absolutely more and relatively more sugar than does juice with low total solids. (9) Relation between total number of spikelets and number of sterile spikelets in wheat (Granthan and Groff). Sterility is not merely absolutely but relatively more frequent in varieties with larger numbers of spikelets. (10) Viability of dominants and recessives in F_2 generation of Mendelian hybrids (Yule). No evidence of differential viability is found in Darbishire's mouse data.—Supplementary formulae are given for computation of correlation between a variable and the deviation of a dependent variable from its probable value.—*Geo. H. Shull.*

29. HERTWIG, GÜNTHER. **Kreuzungsversuche an Amphibien. [Hybridization studies on amphibians.]** Arch. mikrosk. Anat. 91: 203–271. *2 fig.* Aug. 20, 1918.

30. HILL, ARTHUR W. **The history of Primula malacoides Franchet, under cultivation.** Jour. Genetics 7: 193–198. *1 fig., 2 pl.* May, 1918.—Discovered in Yunnan, China 1884 by Père Delavay; described by Franchet, 1886; introduced into cultivation through G. Forrest, 1905, 1906; figured in Gardener's Magazine, December 5, 1908; Revue Horticole, 1912, page 156 (colored). Original plants described in detail with an account of the variations produced under cultivation. These include—increase in size of flowers, several white-flowered sports, one mauve-flowered sport, numerous double-flowered sports showing various gradations in doubling, fimbriation of the corolla and calyx segments and scented and scentless foliage. All hybridization attempts have been failures. Much variation occurs in leaf form.—*O. E. White.*

31. HODGSON, ROBERT W. **An interesting bud-sport in the Washington navel orange.** Jour. Heredity 9: 301–303. *Fig. 2.* Nov., 1918.—This sport shows marked increase in vigor over rest of tree which carries it, as evidenced by sudden increase in diameter of branch at point where sport originates, large vigorous leaves, and abnormal amount of fine twiggy growth. It has also acted as sucker and starved the growth on parent limb behind it. Convincing photograph accompanies the article.—*Merle C. Coulter.*

32. HOLDEN, H. S., AND DOROTHY BEXON. **Observations on the anatomy of teratological seedlings. 1. On the anatomy of some polycotylous seedlings of Cheiranthus Cheiri.** Ann. Bot. 32: 513–530. *17 fig.* Oct., 1918.—Study of vascular anatomy of wall flower seedlings which show stages of polycotyly ranging from hemitricotyly to tetracotyly. Concludes that there are two and perhaps three modes of increase involved: (1) cotyledonary fission, a qualitative division of parent cotyledons; (2) dichotomy of growing point of cotyledon, a true quantitative increase; (3) downward displacement of foliage leaves. Conclusions and results of previous investigators discussed to show that polycotyly in other species exhibits same types of increase. [See Bot. Absts. 1, Entry 1330.]—*A. B. Stout.*

33. JACKSON, S. **"Rogues" among potatoes.** Gard Chron. 64: 210. Nov. 23, 1918.—Takes exception to Sutton's statement that only variations appearing in potatoes are color changes and mentions cases to support his contention.—*Richard Wellington.*

34. JONES, D. F. **The effects of inbreeding and cross-breeding upon development.** Connecticut Agric. Exp. Sta. Bull. 207. *100 p. 12 pl.* 1918.—Review of investigations bearing on this problem together with further data collected for plants. Twelve plates illustrating results with maize are included.—Curves show per cent of heterozygous individuals for 1, 5, 10, and 15 allelomorphs in each selfed generation after a cross. Almost complete homozygosity reached by tenth generation, although theoretically, when a single selfed individual is used for each generation, homozygous condition may never be reached. Results for yield, height of plant, and statistical constants are given for eleven generations of selfed maize strains. Conclusions reached that selfing produces (1) lines which cannot be propagated, (2) lines propagated with difficulty, (3) perfectly normal lines but differing in the amount of growth attained. Comparison made from seed of successive generations of lines selfed for 6 to 9 generations showed only small differences. Six crosses between such selfed lines averaged only slightly greater for height of plant, yield, and ear length than selfed lines. Many of these strains are, therefore, nearly homozygous although some appear more so than others.—Crosses, between selfed lines, compared with parents for the number of characters such as yield and height show heterosis (stimulus accompanying heterozygosis) for many plant characters. Heterosis is also shown to have effect on endosperm development, rapidity of growth, hardiness, viability of seed, susceptibility to smut, *Ustilago zeae*, and "damping off" in radishes.—Effects of inbreeding and crossbreeding have been placed on a Mendelian basis, heterosis being explained by dominance of linked growth factors. Linkage prevents homozygous type from containing as many growth factors as can be obtained in cross. Author says this hypothesis seems logical outgrowth of former view, due to increasing knowledge of methods of inheritance.—*H. K. Hayes.*

35. KEMPTON, J. H. **The ancestry of maize.** Jour. Washington Acad. Sci. 9: 3–11. Jan. 4, 1919.—Critical review of recent article on "Evolution in maize" by WEATHERWAX [Bot. Absts. 2, Entry 76] who attempts to defend theory that genus *Zea* along with *Euchlaena* and *Tripsacum* have descended from common ancestral form now extinct. Present author maintains this theory is not established by arguments presented, which are based mainly upon organological comparisons.—*L. H. Smith.*

36. LENZ, FRITZ. **Alternative Modifikationen bei Schmetterlingen. [Alternative modifications in butterflies.]** Zeitschr. indukt. Abstamm. Vererb. 19: 304–309. Aug., 1918.

37. MIDDLETON, AUSTIN RALPH. **Heritable effects of temperature differences on the fission rate of Stylonychia pustulata.** Genetics 3: 534–572. *5 fig.* Nov., 1918.

38. MILN, T. E. **Fasciation not inherent.** Gard. Chron. 64: 210. *Fig. 83.* Nov. 23, 1918.—Speculation regarding inheritance of peculiar fasciation in vegetable marrow, appearing in previous issue of Gard. Chron., provokes present brief comment on hereditary behavior of fasciations in wheat. Among several cases he has observed author has never found "double" heads in wheat to be inherited.—*L. H. Smith.*

39. NAFZIGER, T. E. **How sorghum crosses are made.** Jour. Heredity 9: 321–322. Nov., 1918.—Detailed instructions with respect to technique of making sorghum crosses are given. Attention is called to the difficulty of crossing the milos.—*C. E. Myers.*

40. PHILIPS, A. G. **Satisfactory method of pedigreeing fowls.** Rel. Poultry Jour. 24: 1107–1108, 1174–1176. *5 fig.* 1918.—Compilation of various methods of pedigreeing poultry which have been found satisfactory at Purdue University. [See also Exp. Sta. Rec. 38: 577. June 14, 1918.]—*H. D. Goodale.*

41. Raunkiaer, C. **Über den Begriff der Elementarart im Lichte der modernen Erblichkeitsforschung. [On the concept of elementary species in the light of modern genetical investigations.** Zeitschr. indukt. Abstamm. Vererb. 19: 225–240. *2 fig.* 1918.—Linnaeus's *formal definition* of species and his *practical delimitation* of species were not in agreement; his formal definition made species a group hereditarily distinct, constant in successive generations, and resembling parents; his practical delimitations of species which have determined the ordinary notions of species, were wider than his definition warranted; he lightly disregarded variations. —Self-fertilizing homozygous organisms agree with Linnaeus's formal definition, and in previous publication Raunkiaer proposed term "geno-species" for such homozygous biotypes. Geno-species have become group units in genetics. Smallest unit in taxonomy is "elementary species." While geneticist determines geno-species by progeny of individuals in question, taxonomist determines elementary species by direct examination of individuals themselves. Author points out that paleontological material would remain unclassified if taxonomy required genetic criteria. He defines taxonomic unit (elementary species) as totality of individuals similar at same developmental stage under same circumstances; he names this group also an "isoreagent," since it is totality of all isoreacting individuals. To illustrate he shows that in F_2 from pair of parents with single factor difference (with dominance) geneticists would make two geno-specific groups and one hybrid group, while taxonomist would see only two isoreagent groups.—*J. P. Kelly.*

42. Raunkiaer, C. **Om Løvsspringstiden hos Afkommet af Bøge med forskellig Løvspringstid.** [Danish, with English abstract]. **[On leaftime in the descendants of beeches with different leaf times.]** Bot. Tidsskr. 36: 197–203. 1918.—Observing beeches under conditions that would eliminate as far as possible influence of age and soil, author saw that certain trees early in leaf remained earliest through three seasons. Fruits of one very late, two late, one early, and one very early, were planted to see if time of leafing is hereditary. Author found close correspondence between mother and offspring, and concludes that within species *Fagus sylvatica* there are subspecies or "isoreagents" differing in regard to time of leafing.—*J. P. Kelly.*

43. Riebesell, P. **Einige zahlenkritische Bemerkungen zu den Mendelschen Regeln. [Some remarks critical of ratios in Mendelian inheritance.]** Biol. Zentralbl. 38: 329–340. Aug., 1918.

44. Russell, E. S. **Derniérs progrés réalisés dans l'étude de la variations, de l'hérédité et de l'évolution.** [Rev. of: Lock, R. H. **Recent progress in the study of variation, heredity and evolution.** *4th ed., 8vo, xii + 336 p., 6 portraits, 47 diagrams.* John Murray: London, 1916.] Scientia 12: 68–69. Jan. 1, 1918.—This fourth edition has been revised by Dr. L. Doncaster, and contains portrait of author and brief biography by his widow. Reviewer points out that author makes common mistake of assuming that conscious effort of organism plays principal rôle in Lamarckian evolution. Lamarck carefully avoided making such statement, the perception and effort put forth by the organism being for most part unconscious or subconscious.—*Geo. H. Shull.*

45. Schiemann, E. [Rev. of: Haenicke, A. **Vererbungsphysiologische Untersuchungen an Arten von Penicillium und Aspergillus. [Genetical investigations on species of Penicillium and Aspergillus].** Zeitschr. Bot. 8: 225–343. *1 pl., 11 fig.* 1916.] Zeitschr. indukt. Abstamm. Vererb. 19: 310–311. Aug., 1918.

46. Shamel, A. D. **Lemon orchard from buds of single selected tree.** Jour. Heredity 9: 319–320. *Fig. 11.* Nov., 1918.—40-acre orchard with 1700 trees and no off-type trees. —*Merle C. Coulter.*

47. Shamel, A. D., and C. S. Pomeroy. **A fruiting orange thorn.** Jour. Heredity 9: 315–318. *Fig. 8–10.* Nov., 1918.—Illustrates abnormally large thorns on rapidly growing branches of Washington navel orange, some of which have developed into branches bearing

fruit, leaves, and secondary thorns. Discusses undesirability of thorns in citrus growing. —*Merle C. Coulter.*

48. SIEMENS, HERMANN W. [Rev. of: SEMON, RICHARD. **Die Fusssohle des Menschen. Eine Studie über die unmittelbare und die erbliche Wirkung der Funktion. [The footsole of man. A study of the direct and the hereditary effect of function.]** Arch. mikrosk. Anat. 82: 164–211. 1913. Zeitschr. indukt. Abstamm. Vererb. 19: 209–210. June, 1918.—Semon cited instance of excessively club-footed girl who developed callosities on dorsal surface of foot, closely resembling those normally developed on foot-sole. As peculiarities of sole are foreshadowed in fetal stages he concluded that here is instance of inheritance of an acquired character. Reviewer admits that this is, as in so many cases, an enticing hypothesis, but points out that Semon's chief argument, namely, that condition of foot-sole in fetus has no selective value, is not convincing because selective value of a character may depend upon some other character with which it is strongly correlated.—*Geo. H. Shull.*

49. SMITH, KIRSTINE. **On the standard deviations of adjusted and interpolated values of an observed polynomial function and its constants and the guidance they give towards a proper choice of the distribution of observations.** Biometrika 12: 1–85. *9 diagrams.* Nov., 1918.—Problem investigated in this paper is manner in which a limited number of observations should be distributed relative to one variable in order to yield greatest amount of knowledge about another variable, known to be a function of the first. A function of nth degree can best be determined by bunching the observations in $n + 1$ groups distributed in a certain way. Distribution depends on whether errors of observation are believed to be uniform for all values of the first variable, or to vary. Cases of continuous increase of errors in one direction, and increase or decrease in both directions, are investigated. There is also analysis of effects of continuous distribution of observations. Continuous distribution of observations, supplemented by taking a certain percentage of them in bunches at ends of the range, is found to have advantages.—*Sewall Wright.*

50. STARK, P. **Die Blütenvariationen der Einbeere. [Floral variations of Paris quadrifolia.]** Zeitschr. indukt. Abstamm. Vererb. 19: 241–303. *35 fig.* Aug., 1918.

51. SUTTON, ARTHUR W. **Bud variation in potatoes.** Gard. Chron. 64: 190, 199–200. *Fig. 79.* Nov. 9, 16, 1918.—Maintains that all authenticated bud sports are color changes in skin of tubers. Variations in several varieties are noted, both losses and additions of such skin colors having occurred. Criticism is made of usual methods employed in determining bud variations. [See also following Entry, 52.]—*Richard Wellington.*

52. TAYLOR, GEO. M. **Bud variation in potatoes.** Gard. Chron. 64: 229. Dec. 7, 1918.—Objects to statements made by Sutton in regard to bud variations calls attention to differences between mutants and "rogues," and states that during this season he has two instances of totally different types to parent on stolon otherwise throwing tubers true to type. [See also preceding Entry, 51.]—*Richard Wellington.*

HORTICULTURE

W. H. CHANDLER, *Editor*

53. CONDIT, I. J. **History of the fig in California.** Fig and Olive Jour. 2 (No. 12, May). *Ibid.* 3 (No. 1, June). 1918.—The Mission fig, Mission olive and Mission grape were introduced by the Mission Fathers more than a century ago. Later introductions, included in Dr. Gustave Eisen's bulletin, are mentioned. In 1894 Mr. John Rock, of Niles, received from the U. S. Department of Agriculture scions of 66 varieties, known as the Chiswick collection furnished to the Department by the Royal Horticultural Society of London. These scions were inserted in old trees on the nursery grounds, and were in good condition in 1914. Since then those not killed by gophers were grubbed out. Fortunately the greater part of the col-

lection had been duplicated at the U. S. Plant Introduction Garden at Chico.—One of the most interesting and varied collections has been assembled by Mr. J. Leroy Nickel at his place at Menlo Park. At one time this collection included the varieties collected by John Rock, Felix Gillet and the Department of Agriculture, besides many importations from France and other parts of Europe, and totaled 125 varieties.—In the spring of 1886, E. W. Maslin planted a seedling fig orchard at Loomis, Placer County, the trees having been raised from seeds of imported Smyrna figs. This orchard developed many interesting and valuable capri figs, as well as promising varieties of the Smyrna type. In 1908 the orchard was leased by the U. S. Department of Agriculture, and since then cuttings from the best trees have been distributed free to growers, by application to G. P. Rixford of San Francisco.—The author in conclusion presents the main facts he has gathered regarding the so-called Kadota fig. Somewhere between 1889 and 1891 the firm of Twogood & Cutter, nurserymen of Riverside, received from H. E. Van Deman of the Department of Agriculture, seven varieties of figs. Among them was one called Dottato which seemed worthy of propagation. All the rest were destroyed. Mr. Cutter showed specimens of the fruit and invited people to sample it at the Fruit Growers Convention, at Los Angeles, about 1892. About 1895 it was found in the hands of Mr. Taft, of Sawtelle, who gave it the name Kadota, although the tag on the original tree read Dottato. Mr. Cutter believed, as stated in the Riverside Press and Horticulturist, that he had found a fig which would be of considerable value for table use and possibly for shipping because of its good quality and freedom from splitting, and he placed the Dottato at the head of all the varieties with which he was acquainted. Mr. James Mills, now of Hamilton City, formerly of Riverside, also pronounces it the finest fig he ever tasted.—The annual report of the Pomologist, contained in the report of the Secretary of Agriculture for 1890, reports the distribution of the Dottato and others. The writer has already published facts regarding the history of this fig and the origin of the misnomer "Kadota." Since it is a misnomer, he believes the use of the name should be discontinued and that Dottato, the correct name, be substituted.—*G. P. Rixford.*

54. Jensen, C. A. **Humus in mulched basins, relation of humus content to orange production, and effect of mulches on orange production.** Jour. Agric. Res. 12: 505–518. Feb. 25, 1918.—Humus determinations were made at intervals in soil from basins around orange trees that had been mulched with manure and alfalfa. The results showed similar increases of humus from the two materials, but the yield of fruit was not correlated with the increases in humus. Alfalfa produced considerably greater yields than manure. Much larger yields of fruit were produced by the use of manure as a mulch than when applied broadcast and plowed down. The yields of fruit as affected by a number of other organic materials were also noted. Jensen concludes that the effects produced are not due to the humus formed, but to plant food made soluble by the action of the organic materials on the soil constituents.—*W. G. Kelly.*

55. Mackie, D. B. **Notes on a navel variety of the Satsuma orange.** California Citrograph 4: 20. Nov., 1918.—Satsuma oranges with a navel mark were observed in Japan by the writer in 1908 and later in 1915. Recently a paper on the subject, entitled, "The appearance of the navel mark on the Satsuma orange," has been published by A. Kikuchi, Director of the Yamagawa Experiment Station. A summary of the paper is given.—*I. J. Condit.*

56. Stewart, John P. **The fertilization of apple orchards.** Pennsylvania State Coll. Bull 153: 1–31. *1 fig.* May, 1918.—The present discussion is based on six experiments in bearing orchards, and covers a production of 36,192 bushels of fruit during the last ten years. Two of these orchards received no cultivation, one was untilled except for two seasons, one was tilled during most of the experiment, and the remaining two were given annual cultivation. In the two most responsive orchards—in both cases orchards receiving no cultivation—nitrogen has been most influential in improving both yield and growth. It has also shown important benefits in these respects in five of the six experiments. Where nitrogen has proved beneficial, its influence has shown no signs of reduction at the close of the ten-year period.

The addition of phosphorus or potash to nitrogen applications has usually given larger returns than nitrogen alone. However, in three of the orchards, the addition of phosphorus has resulted in no important benefit. Neither phosphorus nor lime, when used alone, has shown any important influence on yield or growth in apples. Potash has increased the yields materially in three of the experiments and apparently shown some value in increasing the average size of the fruit. It has also apparently had an injurious effect in two experiments. In a comparison of carriers, no important difference has appeared in ten years between the various forms of potash. The same is true in part of phosphorus, although at present the evidence favors the acid phosphate, at least in the absence of tillage. The distinctly retarding influence of nitrogenous fertilizers and manure on color is due to delayed maturity. In these experiments, fertilization has usually had very little influence on the average size of the fruit. This is apparently because it acted primarily in increasing the total amount of fruit and foliage on the tree, both of which influences tended to decrease the average size of the fruit. Manure, however, usually secured a fair increase in size, probably chiefly because of its moisture-conserving effect. In one orchard—that tilled during most of the experiment—no type of fertilization has yet given a profitable return. In general, the author has been unable to find any definite correlation between soil composition, as ascertainable by the ordinary chemical means, and the actual response of the associated trees to additional fertilization.—*R. D. Anthony.*

57. WICKS, W. H. **The effect of cross-pollination on size, color, shape, and quality of the apple.** Univ. Arkansas Agric. Exp. Sta. Bull. **143**: 1–32. *Pl. I–IX* (*V–IX colored*). Mar., 1918.—Technical. Three year's data are given on the effect on the size, color, shape, and quality of reciprocal crosses between Jonathan, Ben Davis, Winesap, and Grimes Golden apples. A total of 11,290 hand pollinations, producing 773 apples, were made. No effect on the characters studied could be seen due to any of the crosses. Some varieties showed under developed and unevenly developed apples due to imperfect pollination. Where pollination was complete no influence of the male parent could be noted. Greatest affinity was exhibited between: Ben Davis (female) × Grimes, Grimes (female) × Jonathan, Grimes (female) × Ben Davis, Ben Davis (female) × Jonathan. The facts obtained are said to justify the planting of varieties primarily for the benefits of cross-pollination.—*John A. Elliott.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

THALLOPHYTES

58. DRECHSLER, CHARLES. **Morphology of the genus Actinomyces.** Bot. Gaz. **67**: 65–83, 147–168. *Pl. 2–9, 112 fig.* 1919.—Author reviews previous work on this genus and describes the technique which he has developed. The vegetative thallus of *Actinomyces* consists of a my cellium of profusely branching hyphae which attain a much greater extent than the branching figures recorded for bacteria of the acid-fast group. The hyphae are not uniform in diameter. The aerial mycelium usually occurs in the form of a mat with the fructifications distinct, but in some species the fructifications are combined to form erect sporodochia. The individual fructification consists of a sterile axial filament bearing branches loosely or in dense heads. The primary branches may be sporogenous or may produce secondary sporogenous branches. Fructifications tend to be either erect and dendroidal or prostrate and racemose. The sporogenous hyphae are usually coiled spirally. Sporogenesis begins at the tips of the fertile branches and proceeds basipetally. The character of the spirals and of the septa provide specific distinctions. Granules, nuclear in appearance, occur in many spores. The author describes and discusses the occurrence of metachromatic granules in the sterile hyphae; of distensions, and of certain spherical structures. He rejects the theory that *Actinomyces* is transitional between the Hyphomycetes and the Schizomycetes, since it shows no well defined bacterial characteristics (aside from its minute size, which he regards as unim-

portant); and casts doubt on the value of the "acid-fast" staining reaction in mycological research. He believes that the genus should be placed unqualifiedly among the Hyphomycetes. Seventeen morphologically distinct types are described. [See Bot. Absts. 2, Entry 995.]—*E. W. Sinnott.*

59. Georgevitch, P. **Génération asexuée du Padina pavonia Lamour.** [**The asexual generation of Padina pavonia Lamour.**] Compt. Rend. Acad. Sci. Paris 167: 536–537. 1918.—The primary cell giving rise to the tetrasporangium is called the rudiment of a tetrasporangium. It divides into a smaller basal cell, and a larger dome-shaped superior cell, which is the tetraspore mother cell. The nucleus of the latter passes into synapsis and a little later chromosomes become organized. During these processes the nucleolus remains visible but the centrosomes cannot be detected until the last-named stage is reached. At this time also a central intranuclear spindle makes its appearance. It consists of 5 or 6 double fibers extending from pole to pole. At the metaphase which follows 24 chromosomes may be counted, 12 later going to each end of the spindle, respectively. Quadripartition of the cell succeeds the second nuclear division.—*C. H. Farr.*

60. Harper, R. A. **Organization, reproduction and inheritance in Pediastrum.** Proc. Amer. Phil. Soc. 57: 375–439. *2 pl., 35 fig.* 1918.—A continuation of the author's studies on problems of organization in colonial algae. A detailed account is presented of development and inheritance in various species of *Pediastrum.* Cell form is due in part to heredity and in part to environmental pressure and contact relations between cells. The inheritance of cell form is not direct, as is the inheritance of green color, but is indirect; since the germ cell is simple and undifferentiated and develops the typical form of the adult cell only as a result of ontogenetic development. Cell form seems to be the direct expression of the organization of the cell as a whole rather than dependent on chromosomal determiners. Neither does the author believe that the characters of the colony as a whole are due to factorial dispositions in the germ cell but regards them instead as dependent directly on the interactions of the "form, polarities, adhesiveness, surface tension, etc., of the individual cells." Evidence is brought forward that each cell has a biaxial polarity and a specific orientation in the colony. Author discusses the relation of heredity and of environment to morphogenesis in this genus. [See Bot. Absts. 2, Entry 27.]—*E. W. Sinnott.*

61. Harper, R. A. **The evolution of cell types and contact and pressure responses in Pediastrum.** Mem. Torrey Bot. Club 17: 210–240. *27 fig.* 1918.—An evolutinary study of the various subgenera of *Pediastrum* with especial reference to the problems of morphogenesis involved. The manner in which the more complex types have arisen from the simpler ones is suggested and the existence of orthogenetic tendencies in most of the subgenera is noted. The relations between the characters of the cell and the characters of the colony are studied. In order to form a rounded least-surface contour for the colony, the individual cells must lose in part their own tendency to assume the least-surface form owing to contacts with other cells; and this irregular cell form has apparently become fixed by heredity so that it now appears even when the cell grows quite freely. The type pattern of the colony is based on the polarity of the swarm spores and their sensitiveness to contact and pressure stimuli, and not to any factors of mozaic inheritance spatially differentiated in the organization of the mother cell. This polarity of the cells and their capacity to respond to contact and pressure stimuli have probably increased during the evolution of the genus. The gradual construction of a symmetrical colony from a mass of free-swimming swarm spores the author believes not to be due primarily to the physical principles of surface tension, adhesion, mutual pressure, etc., alone, nor to a "mysterious controlling and adaptive principle of behaviour;" but rather to interactions between polarized cells highly sensitive to contact and pressure stimuli.—*E. W. Sinnott.*

62. Harper, R. A. **Binary fission and surface tension in the development of the colony in Volvox.** Mem. Brooklyn Bot. Garden 1: 154–166. *1 pl., 4 fig.* 1918.—*Volvox* has advanced

beyond such forms as *Gonium* in the direction of a typical metaphytic habit in (1) the tenacity with which the cells of the colony adhere to one another, (2) the growth of the germ cells and daughter cells to relatively large size between successive divisions and (3) the possession of differentiated germ and somatic cells. The author discusses the morphogenesis of the *Volvox* colony on the basis of interactions between surface tension, adhesion and binary fission. "The facts as known are certainly quite in harmony with the view that such presumably easily influenced factors as adhesion and surface tension, combined with the more fundamental and ever-present incompatibility between the principles of binary fission and least surfaces, may be of determining significance in the transition from the plate-shaped to the three-dimensional globular form of colony with all its evolutionary significance."—*E. W. Sinnott.*

63. MOREAU, FERNAND M., AND MME. FERNAND. **Étude cytologique du developpement de l'apothécie des Peltigéracées.** [**A cytological study of the development of the apotheciuns in the Peltigeraceae.**] Compt. Rend. Acad. Sci. Paris 166: 178–179. 1918.—According to authors, asci of Peltigeraceae are formed from ascogonia which in *Solorina* arise in the algal layer and in *Peltigera* and *Peltidea* in the medullary layer. The ascogonia are formed from long, isodiametric cells which are at first uninucleate and later multinucleate. Much later the ascogonia give rise to multinucleate ascogenous hyphae, the cells of which very soon become binucleate. The ascogenous hyphae branch and rebranch and the terminal cells form the asci. The two nuclei of terminal ascogenous cell fuse. Resulting nucleus undergoes three divisions. In *Peltigera, Peltidea,* and *Nephromium* each nucleus becomes the nucleus of a spore and later divides two or more times to form the nuclei of the pluriseptate spore. In *Solorina saccata* eight nuclei are formed as with the others mentioned but only four participate in spore formation, the other four nuclei disintegrating in the epiplasm. The resulting four spores become bicellular at maturity. Neither fecundation by spermatia and trichogynes nor a fusion of nuclei preceding that of the ascus were observed.—*F. A. McAllister.*

64. SEAVER, F. J., AND W. T. HORNE. **Life-history studies in Sclerotinia.** Mem. Torrey Bot. Club 17: 202–207. *Pl. 1.* 1918.—A *Sclerotinia* found on rootstocks of *Geranium maculatum* led to a fruitless search for the imperfect stage on living portions of the plant; a *Botrytis* was however isolated from diseased rootstocks when placed in a moist chamber. Cultural studies were then carried out in an effort to connect the *Botrytis* with the perfect stage. Vigorous growths were easily obtained on sterile potato plugs. Cultures made from single ascospores soon gave rise to a *Botrytis*, and comparisons showed the two to be identical. Inoculations were now made using sterile rootstocks and in a few days similar *Botrytis* spores were obtained from each inoculation. Rootstocks are retained in hopes of later securing the perfect stage. Results indicate connection of the *Botrytis* with the *Sclerotinia*, and as the fungus does not fit any found description, it is listed by the authors as a new species, *Sclerotinia* (*Stromatinia*) *Geranii* Seaver and Horne. [See Bot. Absts. 1, Entry 785.]—*E. M. Gilbert.*

BRYOPHYTES

65. EVANS, A. W. **The air-chambers of Grimaldia fragrans.** Bull. Torrey Bot. Club 45: 235–251. *14 fig.* 1918.—There are several tiers of air chambers in the thicker portions of the thallus of *Grimaldia*, and the author states that these are all connected by openings of various sizes. The outer chambers as usual open externally by regular pores. The upper chambers are more or less divided by irregular partitions which are poorly developed in the lower chambers, or may be quite absent. Except for short, tooth-like outgrowths of the partition walls of the dorsal chambers, there is nothing corresponding to the green filaments found in the air chambers of *Marchantia* and several other genera. The chambers all owe their origin to splitting of the cell walls in originally solid tissues. This splitting may begin below the surface of the thallus, or it may start at the surface and extend inwards. The dorsal chambers form first, the inner ones somewhat later. The secondary increase in size of the chambers is due almost entirely to growth of the bounding cells, and only slightly to

further splittings of the cell walls. "The system of united cell-plates in the dorsal chambers, and the partitions between the chambers, increase in vertical height simultaneously. Direct outgrowths from the surfaces of the cell plates play a very small part in the process of subdivision."—*D. H. Campbell.*

SPERMATOPHYTES

66. HIRASE, SAKUGORO. **Nouvelles rechérches sur la fecondation et l'embryogenie du Ginkgo biloba. [New studies of fertilization and embryogeny in Ginkgo biloca.]** Bot. Mag. Tôkiô 32: 83–108. *1 pl.* 1918. [Japanese. Summary in French in same vol. p. 139–143.]—Author reviews the various investigations and opinions concerning origin of the drop of liquid found in the so-called archegonial chamber of *Ginkgo* and cycads. He dissected out the female gametophytes just prior to fertilization and placed them in moist chambers. In this way he was able to observe that a number of minute droplets were formed on the endosperm (female gametophyte) just outside the border of the archegonial chamber. In from ten to twenty hours these attained such size that they fused and sufficed to fill the chamber. If chloroform vapors were introduced into the saturated atmosphere the drops formed within three to six minutes. Osmic acid fumes entirely suppressed the secretion. That this secretion was not a mere condensation of water from the saturated atmosphere was shown by employing younger gametophytes, in which case no droplets at all were formed. Just before entrance of pollen tube into archegonial chamber, the upper part of the egg forms a large vacuole which serves the purpose of a "receptive chamber" for the sperm. Some of the liquid from this vacuole oozes out between the neck cells and becomes mixed with the secretion filling the archegonial chamber.—*L. L. Burlingame.*

67. ARTSCHWAGER, ERNST F. **Anatomy of the potato plant, with special reference to the ontogeny of the vascular system.** Jour. Agric. Res. 14: 221–252. *Pl. 27–47, 4 fig.* 1918.—The vascular topography of the root, stolon, tuber, stem, leaf and flower of *Solanum tuberosnm* is presented in detail; the ontogeny of the vasuclar tissues thoroughly worked out, and the activity of the cambium described. The protoxylem matures before the protophloem, contrary to the usual condition in higher plants. The inner phloem groups of the characteristic bicollateral bundles often occur near center of stem. Their character and position is discussed. The branching and anastomosis of the phloem groups, both inner and outer, is described. A considerable amount of secondary wood is formed, and author calls attention to the large amount and probably important function of the secondary phloem. The observations of Reed on tuber formation are in general confirmed, but author believes that it is the perimedullary zone rather than the pith which forms most of the tuber. Periderm is formed both by hypodermis and epidermis.—*E. W. Sinnott.*

68. DAVIE, R. C. **On the leaf-trace in some pinnate leaves.** Trans. Roy. Soc. Edinburgh 52^1: 1–36. *1 pl.* 1918.—Paper based on a comparative study of the leaf trace of several Ferns, Cycads, Monocotyledons and Dicotyledons. Conclusion is reached that factors controlling form of leaf-trace and its system of branching are: (a) systematic position, (b) length of leaf and size of its appendages, (c) order of development of the pinnae, and (d) type of vascular system found in the stem.—*J. H. Faull.*

69. MORVILLEZ, F. **La trace foliare des Chrysobalanées. [The foliar trace of the Chrysobalanaceæ.]** Compt. Rend Acad. Sci. 166: 859–861. *1 fig.* 1918.—Eight types of leaf traces from different species of Chrysobalaneae are described and figured. They show degrees of development from very simple to complex. They do not show very close affinity with leaf traces of other Rosaceae but present a curious likeness to those of Caesalpinoideae. Hence, since Chrysobalaneae seem to stand about equally distant from Rosaceae and Leguminosae, author considers that they should form a small independent family.—*Eloise Gerry.*

70. MORVILLEZ, F. **La trace foliaire des Légumineuses-Caesalpiniées. [The foliar trace of the Cæsalpineæ.]** Compt. Rend. Acad. Sci. Paris 167: 205–208. *Fig. 1–9.* 1918.—Nine

types of leaf trace are figured and discussed. The results differ from those of Petit (1887). The different appearance of the leaf trace at different heights is pointed out. These leaf traces are, however, related naturally by many common characteristics. They also show certain structures analagous to structures pointed out by the author in the leaf traces of the Rosaceae and Chrysobalaneae respectively and, in addition, structures showing affinities with those which are found in other sub-families of the Leguminoseae.—*Eloise Gerry.*

71. MORVILLEZ, F. **L'appareil conducteur des feuilles des Saxifragacées. [The conducting system of the leaf in the Saxifragaceæ.]** Compt. Rend. Acad. Sci. Paris 167: 555–558. *Fig. 1–9.* 1918.—The characteristics of the conductive structures of the different Saxifragaceae were found to correspond closely to the tribal divisions established morphologically. Representatives of eight tribes are discussed and the disposition of the bundles illustrated by nine text figures. The author concludes that leaf traces with the numerous different regions best defined are found in the tribes with superior ovaries. In those with the ovary generally inferior the leaf trace tends to be reduced to a simple arc; in the forms of this group with opposite leaves vestiges of the other type of bundle arrangement are found but in the tribes with alternate leaves these vestiges are lacking. In certain genera most marked affinities with the leaf traces of the Rosaceae and also certain similarities to those of the Leguminoseae were noted. A further likeness of the Saxifragaceae to the Rosaceae was the reduction of the leaf trace to an open arc, in certain types with inferior ovaries, which the author has found in both families.—*Eloise Gerry.*

72. SMALL, J. **The origin and development of the Compositae. Chapter IV. The corolla.** New Phytol. 17: 13–40. *Fig. 8–10.* 1918.—Previous literature dealing with the corolla of the Compositae is fully reviewed. Fundamental form of corolla is taken to be tubular, with a campanulate upper region and five equal lobes. This, author thinks, gave rise by a mutation to the five-toothed ligulate form characteristic of the Cichorieae. Another mutation led to the appearance of laticiferous vessels in this tribe. The bilabiate corolla characteristic of the ordinary ray floret of the tribes other than the Cichorieae (the inner lip being, however, aborted as a rule) is derived from the tubular type, and from it in turn, by an elongation of tube and a reduction in lips, came the filiform type which is very narrowly tubular without the terminal expansion into a limb. The differences which characterize the mature corollas arise at an early stage, and are based upon differences in the behavior of the two posterior petals. Attempts to modify experimentally the form of the developing corolla were largely unsuccessful. Flower colors of the various tribes are discussed on the assumption that green, yellow, orange, and white are primitive; red, purple, violet, and blue more advanced. The vascular anatomy of the tubular and ligulate corollas is constant; that of the bilabiate corolla is as variable as the external form of this type. These studies of the form, development, color, and anatomy of the corolla confirm, with a few modifications, the phyletic conclusions previously reached upon other grounds.—*C. E. Allen.*

73. SMALL, J. **The origin and development of the Compositae. Chapter V. The pappus.** New Phytol. 17: 69–94. *Fig. 11–18.* 1918.—From the evidences presented by previous writers, and from his own observations, author concludes in favor of the trichome nature of the Composite pappus, holding that the foliose calyx limb, when it occurs teratologically, is a reversion to a pre-Composite ancestor. The setose-scabrid type of pappus, composed of fused uniseriate rows of cells with the obtuse terminal cell of each row free and projecting for a short distance, is considered primitive. Modifications of this give a series of setose types; by lateral fusions of the setae a series of paleaceous forms is produced, and fusion of the setae in clumps gives the aristate types. Short, ring-shaped types result from reduction of either paleaceous or aristate forms. Cohesion and reduction are ruling factors in the evolution of the pappus, as in that of other parts of the flower. Distribution of the various pappus types in the tribes of the Compositae is discussed at length. The dominance of the most primitive forms in *Senecio* confirms this as the basal genus. In general, this study gives results as to phyletic relationships agreeing with those derived from the study of other floral structures

and also, the author thinks, furnishes valuable indications of the more detailed evolution of certain groups such as the Vernonieae, Eupatorieae, Cynareae, and Mutisieae.—*C. E. Allen.*

74. Small, J. **The origin and development of the Compositae. Chapters VI (The involucre), VII (The receptacle), and VIII (Phyllotaxis of the Compositae).** New Phytol. 17: 114–142. *Fig. 19–24.* 1918.—The complete involucre of the Compositae usually includes an inner *pericline*, consisting of bracts which have, or have probably had, florets in their axils; and a *calyculus*, developed from cauline leaves. Author concludes that the capitulum arose from a racemose umbel by an abortion of its pedicels; the bracts of the outer flowers formed a uniseriate pericline, and an aggregation of cauline leaves immediately below the inflorescence produced the calyculus, at first composed of a few scattered members. Progressive sterilization of the floral bracts resulted in a pluriseriate pericline, and progressive aggregation and reduction of cauline leaves gave a denser, pluriseriate calyculus. Distribution of involucral types within the family follows in general the same phyletic lines as does that of floral and other characters studied.—The receptacle is of little phyletic value, but furnishes evidence in favor of origin of several tribes already suggested on other grounds. Primitive receptacle is held to be flat or nearly so, having a foveolate structure and with a tendency to reversion to a pre-Composite ancestor evidenced by the occasional appearance of paleae in the positions of bracts. A progressive development of ridges between depressions in the surface of the receptacle resulted in appearance of other types of receptacle such as the setiferous and the alveolate.—Alternate arrangement of leaves seems to be the primitive condition in the Compositae. This is found in the primitive Senecioninae, with occasional reversions to the opposite-leaved condition probably characteristic of a very distant ancestor. The Heliantheae, although advanced in all their floral characters, show a marked atavistic tendency in their phyllotaxis as well as in other respects. A study of the phyllotaxis of the capitulum shows the calyculus more nearly akin to the cauline leaves than to the periclinal bracts and confirms the distinction drawn between pericline and calyculus; proves the number and position of ray florets to be primarily dependent on the bracts of the pericline; and shows that the uniseriate type of ray is primitive for radiate capitula.—*C. E. Allen.*

75. Small, J. **The origin and development of the Compositae. Chapter IX. Fruit dispersal in the Compositae.** New Phytol. 17: 200–230. *Fig. 25–28.* 1918.—A consideration of published work shows, author thinks, that a number of Compositae are regularly dispersed by wind to distances of 4 to 20 miles, and that pappose fruits are occasionally carried as much as 100 miles. Experiments with a specially devised apparatus in which fruits of various Composites were subjected to air currents of measured pressure showed that air pressures much lower than those assumed by previous writers suffice to carry the fruits for considerable distances. Thus a pressure equivalent to a wind velocity of 2.06 miles per hour carried a fruit of *Taraxacum officinale* immediately through and out of a horizontal tube 125 cms. in length; and at a velocity of 1.01 miles per hour the same fruit was carried laterally to a distance equal to that of the vertical fall. A theoretical consideration of the hydrodynamics of wind dispersal, in connection with these experimental results, leads to the conclusion that, the relative humidity of the air being not above 0.77, a horizontal wind with a velocity of 1.97 miles per hour is sufficient for the dispersal of *Taraxacum* fruits to any distance. If the humidity is greater, the pappus closes and the fruit drops rapidly. The minimum wind velocity for fruit dispersal is estimated for other species as follows: *Senecio vulgaris*, 1.25 miles per hour; *Centaurea imperialis*, 7.3 miles per hour; *Ursinia speciosa*, 2.47 miles per hour; *Leontopodium alpinum*, 4.4 miles per hour. Given a low relative humidity and a wind above the minimum velocity for dispersal of the particular species blowing steadily in the same direction over a large stretch, the author holds that the ordinary pappose fruit can be blown many hundreds of miles over land or sea. It follows that hypothetical land bridges are not necessary to explain the present distribution of the Compositae.—*C. E. Allen.*

76. Weatherwax, P. **The evolution of maize.** Bull. Torrey Bot. Club 45: 309–342. *36 fig.* 1918.—The tribe Maydeae is divided into two classes, and discussion is confined to the three

American genera, *Zea*, *Euchlaena*, and *Tripsacum*, which bear evidences of close relationship and are classed together. The morphology of the three genera is discussed, and is made the basis for the new theory of the evolution of maize which author proposes, after reviewing theories now in vogue and showing their fallacies. Discussion may be summarized as follows: (1) Vestigial organs being considered, *Zea*, *Euchlaena*, and *Tripsacum* are identical in structural plan. Present aspect of each is due to suppression of parts present in a primitive ancestor having perfect flowers borne in one type of inflorescence. (2) The ear of maize is the homologue of the central spike of the tassel. No morphological evidence supports the view that either of these organs originated in the fusion of more simple parts, and there is in no one of the genera here considered any organ the like of which could have united to form either the ear or the central spike of the tassel. (3) The prevailing theory that maize is a species of hybrid origin has little to suggest it when maize and its near relatives are thoroughly understood, and it is not in harmony with the most significant facts of morphology. It seems much more probable that *Zea*, *Euchlaena*, and *Tripsacum* have descended independently from a common ancestral form now extinct. [See Bot. Absts. 1, Entry 503; 2, Entry 35.]—*V. A. Pease.*

77. BEAUVERD, M. C. **Monographie du genre Melampyrum. [A monograph of the genus Melampyrum.]** Mém. Soc. Phys. et Hist. Nat. Genève. 38^4: 1918.—An intensive study of the genus Melampyrum, of which 14 species are recognized, widely distributed in the northern hemisphere. There are 4 areas of distribution; a North American; an Eurasiatic; an eastern Mediterranean, and a Far East or Chinese and Japanese area. Author has studied in the field the range of variation of species and forms and by careful microscopic study of details of flower has convinced himself of relative value of fixed qualitative and variable quantitative characters in the discrimination of the species. There is a résumé of previous work, a treatment in detail of the morphology of the vegetative and reproductive organs and another chapter, entitled "Biological notes," which deals with pollination, distribution of seeds by aid of ants, and some ecological notes based upon author's own observations. [Through review in Nature 102: 115–116. 1918.]—*F. Grace Smith.*

78. ALVARADO, S. **Plastosomas y leucoplastos en algunas fanerogamas. [Plastosomes and leucoplasts in certain phanerogams.]** Trab. Museo Nacion. Cienc. Nat. Madrid Ser. Bot. No. 13. 1918. [Note by L. DUFOUR in Rev. Gén. Bot. 30: 333–334. 1918.]—The plastosomes (chondriosomes) were studied chiefly in the root of *Cicer arietinum.* They are small bodies which may be united into filaments but without losing their individuality, and may again be separated. They are transformed into leucoplasts by a chemical modification without change of form. This transformation occurs in plastosomes in any part of a meristematic cell; in differentiated parenchyma cells, only in perinuclear plastosomes. The number of leucoplasts is increased, not by their division, but only by transformation of additional plastosomes. Starch is formed both in plastosomes and in leucoplasts. In either case the body in question is completely changed into starch.—*C. E. Allen.*

79. GRAHAM, MARGARET. **Centrosomes during early fertilization stages in Preissia quadrata.** Mem. Torrey Bot. Club 17: 323–325. 1918.—After the egg and the antherozoid have united and before the two nuclei fuse, the cytoplasm is differentiated into an inner granular zone and a peripheral vacuolar zone. In the former region are to be found two centrosomes, at first very near together; but as the antherozoid nucleus enlarges they separate and take up positions at the two poles, respectively. The rays are few and very long. Material was fixed in a modified Flemming solution.—*C. H. Farr.*

80. GUILLIERMOND, M. A. **Sur l'origine mitochondriale des plastides. [On the mitochondrial origin of plastids.]** Compt. Rend. Acad. Sci. Paris 167: 430–433. 1918.—Issue is taken with the theory recently supported by Mottier which holds that the plastids are not formed from mitochondria, but that they arise only by division and that they exist in germinal and undifferentiated cells as structures much resembling mitochondria. Evidence

against this theory is found in observations of several types of cells. Author believes it has been demonstrated that pigment bodies of animal cells are formed from mitochondria, and hence by analogy that plastids of plants must arise in the same fashion. It is found in young stems of cucurbits that the amyloplasts arise from chondriocontes. These occur in the same cells as the granular mitochondria, and in the tuber of the potato the latter may also produce amyloplasts. The two types of chondriosomes are held to be genetically related, as is shown in the embryo sac mother cell of the Liliaceae. Author regards interpretation of Mottier to be based on lack of recognition of occurrence of two kinds of mitochondria.—*C. H. Farr.*

81. MOTTIER, D. M. **Chondriosomes and the primorida of chloroplasts and leucoplasts.** Ann. Bot. 32: 91–114. *1 pl.* 1918.—Two kinds of structures frequently occur in the cytoplasm of plant cells which have by some investigators been included under the term chondriosomes. These are chondriosomes proper, and the primordia of plastids. Both divide by constriction and in some cases are so similar as to be indistinguishable, although the latter are frequently thicker rods. These enlarge and become chloroplasts or leucoplasts, while the true chondriosomes remain unchanged. These stages of development are traced in successive cells beginning at the meristem in root tips and at the apical cell of the thallus in *Marchantia.* In this genus very large chondriosomes and an absence of chloroplasts are to be noted in the mucilage-producing hairs on the ventral scales, in the young rhizoids and in spermogenous tissue. The primordia of plastids are not demonstrated in these cells, but it is believed that they are present in all germinal tissue at least. A study of *Anthoceros,* with only one chloroplast, demonstrates that the chondriosomes are not disorganized chloroplasts and that they resemble somewhat the pyrenoids. In *Adiantum,* products of the plastids stain differently from the chondriosomes. *Elodea* was studied for comparison with other workers. It is concluded that the chondriosomes and primordia of plastids as well as the nucleus are transmitted in sexual reproduction and are bearers of hereditary characters.—*C. H. Farr.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

82. ANTEVS, E. **Some corrigenda.** Geol. Fören. Förhandl. 40: 892–893. Nov., 1918.—Contains corrections of statements made in the author's paper on the post-glacial marine history of Bohuslän and reports the following fossil plants from the submerged peat bog at Kongedybet in Denmark: *Corylus avellana, Cornus sanguinea, Crataegus, Betula, Mnium, Viburnum opulus, Alnus glutinosa, Populus tremula, Rhamnus frangula, Ranunculus repens, Spiraea ulmaria and Phragmites communis.—Edward W. Berry.*

83. BERRY, EDWARD W. **Eucalyptus never present in North America.** Science 49: 91–92. 1919.—Comments on the origin and distribution of the Myrtaceae and concludes that the fossil forms from North America identified as *Eucalyptus* represent the ancestral stock of *Myrcia* and *Eugenia.* Suggests that the non-committal name *Myrtophyllum* be used for Eucalyptus-like leaves of uncertain generic relationship within the family Myrtaceae.—*Edward W. Berry.*

84. BERRY, EDWARD W. **The fossil higher plants from the Canal Zone.** U. S. National Mus. Bull. 103: 15–44. *Pl. 12–18.* Jan., 1919.—An account of the fossil vascular plants discovered during the geological studies of the Canal Zone. The deposits containing plants are for the most part tuffs and the materials are usually poorly preserved. They include fragments of a fern thought to represent *Acrostichum,* two undetermined palms represented by leaves and a third represented by wood, and 16 species of dicotyledons represented by leaves and fruits. The petrified palm, *Palmoxylon palmacites* and an abundant petrified leguminous tree, *Taenioxylon multiradiatum,* are common to the Oligocene of the Island of Antigua.

With these two exceptions together with the euphorbiaceous species *Hieronymia Lehmanni* common to the Tertiary of Ecuador, and *Guatteria culebrensis* n. sp. which has subsequently been found in the lower Miocene of northern Peru, the species are not known outside of the Panama region and are new to science. The petrified fruits of a new species of ebony, *Diospyros Macdonaldi* are thought to be of Eocene age. The balance of the material is of Oligocene and lower Miocene age and comprises the following: *Ficus culebrensis*, *Myristicophyllum panamense*, *Inga oligocaenica*, *Cassia culebrensis*, *Hiraea oligocaenica*, *Banisteria praenuntia*, *Schmidelia bejucensis*, *Mespilodaphne culebrensis*, *Calyptranthes gatunensis*, *Melastomites miconioides*, *Rondeletia goldmani*, and *Rubiacites ixoreoides*.—*Edward W. Berry.*

PATHOLOGY

DONALD REDDICK, *Editor*

85. ANONYMOUS. **L'inspection phytopathologique des Etablissements agricoles, horticoles et viticoles (Communique). [Phytopathological inspection.]** Rev. Vit 48: 93–94. 1918.—Official order from the French Minister of Agriculture.

86. BERNATSKY, J. **Anleitung zur Bekämpfung der Peronospora des Weinstockes nach den neuesten Erfahrungen und Versuchsergebnissen. [Guide for control of Peronospora viticola according to latest experience and investigation.]** Zeitschr. Pflanzenkr. 28: 1–28. 1918.—Elementary treatise touching minutely on the details considered of importance in controlling downy mildew. Cultural practices of importance include; air drainage by weeding and by using only low-growing intercrops; prompt hardening of tissues by use of potash, lime, etc., and avoidance of nitrogenous fertilizers; also avoidance of summer pruning which forces new growth; proper pruning and summer tying to keep clusters and shoots well off the ground.—Really resistant varieties do not exist and one of the finest varieties, Chasselas, is most susceptible.—One to six treatments with prophylactic spray are required depending on raininess of the season. Details about apparatus and materials, preparation and use of Bordeaux mixture, care of machinery, etc.—When primary lesions appear treatment should be begun. Enough labor should be at hand to do the work promptly. Italian prisoners are apt at spraying, Russians are not so good.—When blue vitriol is an exorbitant price, "perocid" may be substituted. Review of European experience with this material indicates that 1.5 per cent "solution" is effective. Silver salt of nucleic acid and zinc sulfate with lime may be substituted. The latter material is effective in years of mild attack but does not adhere well, clogs nozzles, and if used late injures the must.—Proprietary copper mixtures are condemned.—Great emphasis placed on importance of covering every cluster and every leaf.—In small vineyards the leaves showing primary infection may be plucked and burned.—*D. Reddick.*

87. CAPUS, J. **Comparaison entre les effets des bouillies cupriques basiques et des bouillies acides. [Comparison of the effects of copper mixtures and acid mixtures on mildew of the vine.]** Compt. Rend. Acad. Agric. France 4: 86–90. 1918.—Acid and basic mixtures are equally efficacious against downy mildew of the vine (*P. viticola*), but for a period exceeding 20 days and during heavy rains, basic mixtures retain their efficacy better than acid ones. [Abst. in Internat. Rev. Sci. Pract. Agric. 9: 629–630. 1918.]—*D. Reddick.*

88. CAPUS, J. **Le mildiou. [Downy mildew of grapes.]** Rev. Vit. 48: 65–71. 1918.—Essentially a restatement of the facts discovered by author and others on relation of rains of various durations to infection by *Plasmopara viticola*, their relation to time of treatment, effect on the fungicides etc. Citations of conditions since 1901.—*D. Reddick.*

89. CAPUS, J. **Sur la maladie vermiculaire des pois dans la Gironde. [Nematode disease of peas in Gironde.]** Compt. Rend. Acad. Agric. France 4: 712–715. 1918.—*Heterodera schachti* is the chief cause of drying out of roots and gradual death of plants from base. Disease is serious in Gironde. *Fusarium vasinfectum* var. *pisi* is commonly present but is thought

usually to follow injury by nematodes and other agents.—Practice of fall-sowing of peas and of following peas with peas accounts for unusual prevalence in the region.—*Sclerotinia libertiana* has been observed to cause similar symptoms.—*D. Reddick.*

90. Clinton, G. P. **Report on fungous diseases of 1917.** Rept. Conn. Veg. Grower's Assoc. 1917: 14–15. 1918.

91. Clinton, G. P., and W. E. Britton. **Spray calendar.** Connecticut Agric. Exp. Sta. Bull. 199: 53–98. 1918.—A brief illustrated account of the diseases and insect injuries of plants cultivated in Connecticut.

92. Cook, M. T. **Common diseases of berries.** New Jersey Agric. Exp. Sta. Circ. 88. *12 p., 6 fig.* (Revised.) 1918.—Symptoms, cause and control of the more common diseases of blackberries, raspberries, dewberries, gooseberries, currants, strawberries, and cranberries are discussed in a popular way.—*L. M. Massey.*

93. Cook, M. T. **Common diseases of garden vegetables and truck crops.** New Jersey Agric. Exp. Sta. Circ. 89. *24 p. 12 fig.* (Revised.) 1918.—A brief and popular discussion of symptoms and causes of diseases of garden vegetables and truck crops, together with specific and general recommendations for control.—*L. M. Massey.*

94. Cook, M. T. **Common diseases of shade and ornamental trees.** New Jersey Agric. Exp. Sta. Circ. 98. *27 p., 11 fig.* 1918.—Brief, popular discussion of the more common diseases of shade and ornamental trees under the headings of root, stem and foliage troubles, with recommendations for control. Attention is directed to the undesirable features of some trees; mechanical injuries and those resulting from fires, salt poisoning, gas, fumes and freezing; and to care and cultivation.—*L. M. Massey.*

95. Cook, M. T. **Common diseases of ornamental plants.** New Jersey Agric. Exp. Sta. Circ. 97. *23 p., 10 fig.* 1918.—Brief popular discussion of the more common diseases of ornamental plants are given, together with recommendations for control.—*L M. Massey.*

96. Cook, M. T., and W. H. Martin. **Leaf blight of the tomato.** New Jersey Agric. Exp. Sta. Circ. 96. *4 p., 1 fig.* 1918.—Popular discussion of leaf blight (*Septoria lycopersici*) followed by a brief discussion of results of spraying experiments conducted in 1916 and 1917. In the experiments in 1916 the best results were obtained from using 4:4:50 Bordeaux mixture. In 1917 the standard 4:4:50 Bordeaux mixture gave the highest yield, while the best control of the fungus resulted from the use of a mixture consisting of 4 pounds copper sulphate, 2 pounds lime and 3 pounds resin fish-oil soap to 50 gallons of water. The manner of preparation of the mixtures is given.—*L. M. Massey.*

97. Drechsler, Charles. **The taxonomic position of the genus Actinomyces.** Proc. Nation. Acad. Sci. U. S. A. 4: 221–224. 1918.—"There seems to be no adequate reason why the genus should not be classed with the Hyphomycetes." [See Bot. Absts. 1, Entry 775.]

98. Gäumann, Ernst. **Über die Formen der Peronospora parasitica (Pers.) Fries. [The forms of Peronospora parasitica.]** Beih. Bot. Centbl. 35: 395–533. *Fig. 1–47.* Sept., 1918.—Morphological and statistical study bearing on the question of species in parasitic fungi.—*D. Reddick.*

99. Harter, L. L. **Podblight of the Lima bean caused by Diaporthe phaseolorum.** Jour. Agric. Res. 11: 473–504. *Pl. 42–43, fig. 11.* 1917.—Podblight is a common and destructive disease of the Lima bean (*Phaseolus lunatus* L.) occurring both on the pods and stems. Previous to the present work only the pycnidial stage (*Phoma subcircinata*) of the causal fungus was known. Although Cooke and Ellis had described *Diaporthe phaseolorum* as occurring on the dead vines of Lima beans, its connection with *Phoma subcircinata* was not established.—The author wintered out vines and pods infected with *Phoma subcircinata* and

Diaporthe phaseolorum later developed thereon. Isolations from single ascospores gave a fungus identical morphologically with *Phoma subcircinata.* The pod blight disease was also produced in a large number of infection experiments by the fungus isolated from the ascospore. A study was also made of the mode of infection, effect of light on, and the relation of temperature to the growth of the fungus. [Abst. by Tobler in Zeitschr. Pflanzenkr. **28**: 334. 1918.]—*L. L. Harter.*

100. HARTER, L. L., J. L. WEIMER, AND J. M. R. ADAMS. **Sweet potato storage rots.** Jour. Agric. Res. **15**: 337–368. *Pl. 21–27.* 1918.—As a result of several years study sixteen different species of fungi were found to cause rots of sweet potatoes in storage or to reduce their market value. The greatest loss is caused by seven different species of fungi; viz., *Rhizopus nigricans, Sphaeronema fimbriatum, Diplodia tubericola, Diaporthe batatatis, Plenodomus destruens, Sclerotium bataticola,* and *Monilochaetes infuscans.* The remaining nine fungi; viz. *Mucor racemosus, Alternaria* sp., *Penicillium* sp., *Botrytis cinerea, Epicoccum* sp., *Gibberella saubinetii, Fusarium culmorum, Fusarium acuminatium, Trichoderma koningi,* were classed as minor rot producing organisms capable of causing decay only under especially favorable conditions. *Rhizopus nigricans* is well known to be the most destructive of the storage rot fungi. Infections with this organism were difficult to obtain under artificial conditions.—A study was made of the influence of temperature and humidity on infection and subsequent decay by these different species. In all cases with the exception of *Diplodia tubericola* a high relative humidity was found essential. The different species varied considerably in the range of temperature at which they would produce decay. Some of the minor rot organisms, as for example *Mucor racemosus, Fusarium culmorum* and *F. acuminatum,* decayed the sweet potatoes at a temperature considerably lower than that of the optimum temperature for the growth of the fungus.—*L. L. Harter.*

101. HEADLEE, T. J., M. T. COOK, M. A. BLAKE, AND A. J. FARLEY. **Spray calendar for the peach.** New Jersey Agric. Exp. Sta. Circ. 94. *4 p., 3 fig.* 1918.

102. HEADLEE, T. J., M. T. COOK, M. A. BLAKE, AND A. J. FARLEY. **Spray calendar for apples and quinces.** New Jersey Agric. Exp. Sta. Circ. 93. *4 p., 3 fig.* 1918.

103. ITO, SEIYA. **A preliminary report on a late-blight resistant strain of potato.** Ann. Phytopath. Soc. Japan **1**: 5–8. *Fig. 1.* 1918.—From a continued field observation in the different soils and climates during many years it may be sufficient to conclude that the new strain, "Ekishirazu," found in Japan, is highly resistant to the late blight. The variety was first imported from a foreign country (France?) in about 1903, and after successive culture during three to six years this highly resistant strain, now known as "Ekishirazu," originated among the progenies of the seedlings. The defect of the strain, however, is its lack of sweetness as compared with the taste of "Snowflake," and does not prove to be resistant to the early blight and rosette.—*T. Matsumoto.*

104. KILLER, J. **Versuche über die Eignung des essigsäuren Kupfers zur Bekämpfung des Steinbrandes. [Adaptability of copper acetate for the control of smut.]** Zeitschr. Pflanzenkr. **28**: 106–109. *4 fig.* 1918.—Seed of wheat, barley and oats of crop of 1911 very much injured by treatments for 14 hours with 0.5 per cent solution. This strength kills spores of *Tilletia tritici* very quickly. Later comparisons of copper acetate with formaldehyde, copper sulfate, corrosive sublimate and proprietary preparations ("Uspulun" and "Sublimoform") lead to the conclusion that it may be used for smut control in 0.5 per cent concentration, soaking 16 hours. Germination is retarded as compared with formaldehyde-treated seed but this is more than offset by the fact that disinfecting action is still effective in the soil and this is of importance at times.—*D. Reddick.*

105. KILLER, J. **Wurzelbrandbekämpfungsversuche bei Runkelrüben mit essigsäurem Kupfer im Vergleich mit anderen Beizmitteln. [Control of root rot of beets with copper acetate**

as compared with other fungicides.] Zeitschr. Pflanzenkr. 28: 109–110. *2 fig.* 1918.—Following substances tested by treating beet seed in various strength solutions and for varying lengths of time as indicated: Formaldehyde 0.1 per cent for thirty minutes and 0.2 per cent for five minutes, mercuric chloride 0.1 per cent for one hour and 0.2 per cent for five minutes; "Uspulun" 0.25 per cent for eight hours and 0.5 per cent for five minutes, copper sulfate, 0.5 per cent for twelve hours and 1 per cent for five minutes, copper acetate 0.1, 0.25 and 0.5 per cent for twelve hours and 1 per cent for five minutes. Root rot, caused by *Aphanomyces laevis* and *Phoma betae*, appeared in plants from untreated seed to extent of 54 per cent and in plants from treated seed in a range from 34 to 63 per cent, i.e., none of the treatments proved effective. "Uspulun" has been highly recommended for this disease. [Regarding it, see Bot. Absts. 2, Entry 115.]—*D. Reddick.*

106. LEVINE, ISAAC, AND MICHAEL LEVINE. **Malignancy of the crown gall and its analogy to animal cancer.** Proc. Soc. Exp. Biol. Med. 16: 21–22. 1918.—"In a study reported recently on the influence of X-rays on the development of the crown gall, the writers have come to the conclusion that this growth presents an ideal material for the cellular study of the cancer problem. Dr. Erwin F. Smith, of Washington, considers this parasitic disease of plants to be identical with human cancer to such an extent that, since crown gall is caused by a microorganism, he maintains that all human cancers must be due to the same parasite. It seemed desirable to repeat Smith's experiments from the standpoint of human pathology and this was the object of the present investigation.—A large number and a great variety of plants were inoculated with a pure culture of *Bacterium tumefaciens* and a gross and microscopical study of the resulting crown galls was made. The analysis of the material shows that a certain number of these plant-tumors behave morphologically as well as biologically as benign growths. They grow very slowly, do not interfere with the development of the inoculated plant, and compress but do not injure the neighboring normal tissues. Other crown galls appear to be true malignant tumors. They dwarf the inoculated plant. The parts of the inoculated stem become necrotic above and even below the point of inoculation. Microscopically the galls show invasion and destruction of the neighboring normal tissues. In accordance with the findings of Smith a number of crown galls were obtained containing leafy shoots. Smith considers the latter condition to be analogous to human embryomata. A close microscopical study of the crown gall revealed characteristics which differ materially from the conditions obtained in animal cancer. In the majority of the specimens investigated the entire gall presents a uniform morphological appearance of small, young, undifferentiated cells. In other tumors the central growing part presents the usual appearance of a crown gall, while the periphery shows the development of adult differentiated tissue (parenchyma). This parenchyma is a part of the new growth and not of the normal tissues of the inoculated plant. The same is true of rudimentary organs (conducting system), or even a whole rudimentary organism (leafy shoot), which may appear at the periphery or in other parts of the ordinary crown gall. Such an appearance of highly differentiated tissues subsequently to and as a part of the development of a malignant tumor is unknown in animal cancer.—The conclusion to be arrived at from this study is that a fast developing simple crown gall presents a great deal of analogy to animal cancer and offers an ideal material for the cellular study of the latter condition. On the other hand the structure of the growing central part is identical in practically all the crown galls investigated thus far. It represents therefore only one type in the large group of pathological processes designated under the common name of cancer. It is hardly possible to assert on the basis of the study of the crown gall that all human cancers are formed through the activity of one and same microörganism."—*I. Levine and M. Levine.*

107. LINT, HENRY CLAY. **Seed and soil treatment for the control of potato scab.** New Jersey Agric. Exp. Sta. Circ. 95. *4 p., 1 fig.* 1918.

108. MONTEMARTINI, L. **Spora la resistenza delle quercie all'oidio.** Riv. Pat. Veg. 9: 77–79. 1919.—As previously reported by other writers, various American species of oaks

(*Quercus coccinea*, *Q. rubra*, *Q. stellata* and others) were found to be immune to attacks of powdery mildew. Leaves of these resistant American oaks were collected early in September and determinations of nitrogen content, total, soluble and insoluble, were made. It was found that only a little over one-tenth of the nitrogen present was soluble. This agrees with the previously published report of Pantanelli, that in susceptable oaks the soluble nitrogen forms four to seven-tenths of the total nitrogen while in resistant oaks it goes down to three-tenths.—*F. M. Blodgett.*

109. NISHIMURA, MAKOTO. **A carrier of the mosaic disease.** Bull. Torrey Bot. Club **45**: 219–231. *Pl. 7.* 1918.—*Solanum aculeatissimum*, apple of Sodom, is susceptible to mosaic, of tobacco, showing typical symptoms. *Physalis alkekengi* fails to show any symptoms upon inoculation with the virus but when the expressed juice of such inoculated plants is used for inoculating susceptible species the disease appears in the usual incubation period and in typical form. Concise experimental data are furnished to support the conclusions.—*D. Reddick.*

110. SAWADA, KANEYOSHI. **A new rust-fungus parasitic on the cultivated rose.** [Text in Japanese]. Trans. Sapporo Nat. Hist. Soc. 7: 36–40. *Fig. 1–3.* 1918.—The fungus forms brown spots scattered on the living leaves, stipules, young twigs, fruits, etc. of *Rosa indica* var. *formosana* grown in Formosa, Japan, and frequently induces great damage in the rose nursery. No spores except teleutospores were observed in the microscopical investigation. From the morphological character of the teleutospores the author proposes for the causal fungus the name *Kuehneola rosae.* The morphological description is given as follows: spores 15–52 × 14–28μ, one-celled, 2–5 forming a chain. This is closely allied to *Kuehneola japonica* found on *Rosa*, but is distinguished by the number of the larger sized teleutospores in a chain. [See Bot. Absts. 2, Entry 784.]—*T. Matsumoto.*

111. SHIMBO, IPPO. **Studies on some insect-galls in Japan.** [Text in Japanese.] Bot. Mag. Tôkyô 32: 121–128. *Fig. 1–3.* 1918.—The author gives detailed descriptions of morphology of two insect-galls found in Japan, (1) on the leaves of *Illicium anisatum* and (2) on the leaves of *Machilus thunbergii.* The distribution of starch, sugar, protein, fat, tannin, inorganic salts and certain enzymes in the tissue of both diseased and healthy leaves is also reported. From the experiment it is inferred that tannin, starch and sugar are a little more concentrate in gall-tissue of Illicium than in healthy tissue. No crystals of calcium oxalate are observed in the gall-tissue. The life-history of the causal insects and the nature of the parasitic fungi in the galls is also described to a certain extent.—*T. Matsumoto.*

112. STAKMAN, E. C., AND A. G. TOLAAS. **The control of brown rot of plums and plum pocket.** Minnesota Hort. **46.** May, 1918. [*Illust.*]—Brown rot of plums, which is serious in Minnesota nearly every year, is discussed and satisfactory methods of control are outlined. Plum pocket (caused by *Exoascus pruni*), which has been under investigation at the Minnesota Experiment Station for about five years, is more difficult to control than brown rot. Recommendations for the control of plum pocket are given, as follows: (1) Destroy all mummied plums; (2) prune out and burn affected twigs; (3) spray with either Bordeaux mixture, 3–4–50, or lime-sulfur 1–40, as for brown rot. An application made when the flowers are just beginning to show color seems essential. It is suggested that a dormant spray be tried.—*L. R. Hesler.*

113. STRICKLAND, F. L., AND N. R. PEET. **The spraying service in Niagara county in 1917.** New York Dept. Farms and Markets, Agric. Bull. 106: 1–147. *Fig. 1–37.* 1918.—An account of an effort by the Farm Bureau of Niagara County, New York, coöperating with other State and Federal agencies, to furnish a large number of fruit growers with accurate, timely information on spraying for the control of fungous diseases and insect pests. Some of the methods employed were original and unique. By means of a telephone relay system and code messages the information was disseminated with remarkable rapidity. Instructions were given for the control of scab and codlin moth in apple orchards; psylla in pear orchards; yellow

leaf, curculio and red mite in plum orchards; yellow leaf and fruit fly in cherry orchards; curculio and fruit spot in quince orchards; and downy mildew in vineyards. In making his recommendations for treatment the expert in charge was guided by the conditions in representative ("criterion") orchards kept under close observation in different parts of the county. These recommendations are given in detail together with a large number of data on the results obtained by orchardists who carried them out. The authors consider the undertaking to have been highly successful.—*F. C. Stewart*

114. TOBLER, G. **Sulfadherent.** Zeitschr. Pflanzenkr. 28: 210. 1918.—This is the name of a preventive which H. Callier, of Lausanne, has found valuable for [the mildews? of] grapes. It consists essentially of a mixture of sulfur, copper sulfate and nicotine. It adheres better than other mixtures. Two applications are enough [to control the mildews?], the first treatment being made about June 1, the second late in July. The material is applied dry. It seems also to have value for control of "potato diseases."—*D. Reddick.*

115. WECK, [—] **"Uspulun," ein neues Beizmittel für Getreide. ["Uspulun," a new disinfectant for grains.]** Illustr. landw. Zeitg. 36: 552. 1916.—Effective agent is a mercury salt of a chlorophenol. In its effect on germination of the seed and on control of smut it has proved efficient in comparison with other disinfectants. [Through abst. by O. VON KIRCHNER in Zeitschr. Pflanzenkr. 28: 50. 1918.]—*W. H. Rankin.*

116. WEISS, J. E. **Einfluss der Witterungsverhältnisse auf das Auftreten von Pflanzenkrankheiten und tierischen Schädlingen 1916 und 1917. I. [Influence of weather conditions on the occurrence of plant diseases and animal pests in 1916 and 1917. I.]** Zeitschr. Pflanzenkr. 28: 116–142. 1918. Same general title, II, III, IV. *Ibid.* 28: 201–210. 1918.—In gathering material for "Herbarium pathologicum" (Weigel: Leipzig) during wet season, 1916 and dry season, 1917, observations were made on prevalence of a large number of diseases which are noted, each in a short paragraph. General conclusion is that wet weather favors and dry weather suppresses the appearance of diseases caused by following organisms: *Phytophthora infestans, Plasmopara viticola, Peronospera viciae, P. nivea, P. schleideni, Bremia lactucae, Cystopus candidus, C. tragopogonis, Ustilago spp., Uromyces betae, Puccinia poori, P. graminis, P. coronifera, Phrgmidium subcorticium, Ph. violaceum, Cronartium paeoniae, Melampsora salicina, Sphaerotheca pannosa, Erysiphe polygoni, Phyllactinia corylea, Uncinula necator, Microsophaera alni, Entomosporium maculatum, Marssonina juglandis, Clasterosporium carpophilum, Fusicladium dendriticum, F. pirinum, Gloeosporium ribis, G. lindemuthianum, G. nervisequum, Actinonema rosae, Phyllosticta fragariicola, Ph. rosae, Ascochyta pisi, Septoria piricola, S. apii, Epichloë typhina, Claviceps purpurea, Rhytisma acernum, Ceratophorum setosum.*—While infection usually occurs in young leaves the cuticle of which is not fully developed, in some cases infection comes only after full development. Here are found the following parasites: *Entomosporium maculatum, Cronartium ribicola, Ceratophorum setosum.*—The following are dependant on wet soil: *Plasmodiophora brassicae, Tilletia tritici,* and the true loose smuts.—There is a considerable group of parasites unclassified.—II. Origin of certain leaf spots on various ornamental plants is discussed. These appear in rainy seasons and are caused by shading and the action of various saprophytes which attack primarily the clinging petals of fallen blossoms.—III. Effect of seasons on a long list of insect pests.—IV. Control of mustard by dusting with calcinated iron sulfate or with 40 per cent mixture of potassium chloride or nitrate in lime dust on moist foliage. Iron-sulfate spray (15–20 per cent) is also effective.—*D. Reddick.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, *Editor*

117. HOLM, T. **Juglans nigra L. and J. cinerea L.** Merck's Rept. 27: 115–117, 168–170. 1918.—*Juglans nigra,* a large tree of the Juglandaceae is of some importance medicinally and as a dyestuff, the rind of the green fruit and the bark of the root being used. The staminate and pistillate flowers and the internal structure of the vegetative organs are figured and described in detail. The bark of the root of *J. cinerea* is used similarly, and the structure is said to be identical with that of *J. nigra.*—*J. Moser.*

118. HOLMES, E. M. **Ghassoul—A Morocco Drug.** Pharm. Jour. 101: 317. 1918.—A packet of stalks and buds included in a collection of Morocco drugs brought to England by Dr. Arthur Leared in 1873 and used in Morocco for cleaning woolen clothes, was approximately identified at that time as derived from the genus *Mesembryanthemum.*—M. E. Wilczch (Schiw. Apoth. Zeit. Oct. 3, 1918) states that a sample of Ghassoul, which is used as a substitute for soap in Abyssinia, contained some ripe seeds which upon planting developed into fine specimens of *Mesembryanthemum nodiflorum* and *M. crystallinum,* the latter in smaller proportion.—This apparently completes the identification of Dr. Leared's sample. The ash of species of this genus yields a very pure soda but the detergent qualities of the plant probably are due to saponin.—*E. N. Gathercoal.*

119. GREENISH, HENRY G. **Examination of a Transvaal Croton bark.** Pharm. Jour. 101: 289. 1918.—This bark obtained from South Africa where it is pronounced as an excellent remedy, in 2-grain doses, for bilious malarial fever, was referred at the Royal Botanic Gardens, Kew, to the tree, *Croton Gubouga* S. Moore, a species widely spread in Nyasaland, Rhodesia and Portuguese East Africa.—In external appearance the bark is 2 to 3 mm. thick, generally gray in color, with corky warts or longitudinal bands of cork. The bark possesses a persistently acrid, somewhat numbing taste. Microscopically, bast fibers, single and in groups, much thickened and distinctly striate were found; sclerenchyma cells, about the size of the parenchyma and formed into small masses were abundant; calcium oxalate crystals in prisms and rosettes were very numerous; a few small starch grains and small oil drops were found in the parenchyma cells and in the longitudinal section some elongated cells with the inner lamellae of the walls suberized and containing yellowish granular secretion were seen.—Upon exhaustion with petroleum spirit, 2.54 per cent of thick fatty oil, exceedingly acrid in taste, was obtained. Further exhaustion with ether and chloroform yielded very small, slightly acrid residues, but alcohol then removed 2.71 per cent of extractive, acrid in taste. Alcohol of 50 per cent strength apparently extracts the drug. No volatile principles were obtained, nor alkaloids nor bitter principles. The viscid oil was in too small quantity for further examination.—This bark therefore corresponds, in many respects, to some other Croton barks, especially to that of *Croton Tiglium* which, is extremely acrid.—*E. N. Gathercoal.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

GENERAL

120. HARVEY, R. B. **Hardening process in plants and developments from frost injury.** Jour. Agric. Res. 15: 83–112. *Pl. 7–11, A*; *Fig. 1–3.* 1918.—The author makes an extensive study of frost injury to various plants and concludes that it varies largely with the plant. Succulent plants exhibit the appearance of injected areas over the leaf surface; leaves of cabbage and the like show stimulated growth with ultimate production of tumors; and leaves of tomato and *Coleus* are killed. Various suggestions are offered in explanation of the effects of frost injury, the increase of hydrogen-ion concentration being considered the

principal factor. Less injury is noted with plants that have been hardened, and the phenomenon is explained upon the grounds that the process of hardening so alters the constituents of the protoplasm that the precipitation of proteins is averted. [See Bot. Absts. 2, Entry 374.]—*R. W. Webb.*

121. Stanford, Ernest E., and Arno Viehoever. **Chemistry and histology of the glands of the cotton plant, with notes on the occurrence of similar glands in related plants.** Jour. Agric. Res. 13: 419–435. *Pl. 49–50.* 1918.—See Bot. Absts. 1, Entry 1597.

122. True, Rodney H., Otis F. Black, James W. Kelly, H. H. Bunzell, Lon A. Hawkins, Samuel L. Jodidi, and Edward H. Kellogg. **Physiological studies of normal and blighted spinach.** Jour. Agric. Res. 15: 369–405. 1918.—A biochemical study of a "mosaic" disease is elaborated, dealing with ash, carbohydrate, nitrogen, and oxidase contents, and activities in normal and in blighted spinach.—*R. W. Webb.*

DIFFUSION AND PERMEABILITY

123. Osterhout, W. J. V. **Conductivity as a measure of permeability.** Jour. Biol. Chem. 36: 485–487. 1918.

124. Osterhout, W. J. V. **A method of measuring the electrical conductivity of living tissues.** Jour. Biol. Chem. 36: 557–568. *Fig. 1–8.* 1918.

125. Osterhout, W. J. V. **Note on the effect of diffusion upon the conductivity of living tissue.** Jour. Biol. Chem. 36: 489–490. 1918.

WATER RELATIONS

126. Bakke, Arthur L. **Determination of wilting.** Bot. Gaz. 66: 81–116. *Fig. 1–5.* 1918.—Daily march of transpiration of *Helianthus annuus* is studied by the standardized hygrometric paper method. [See Bot. Absts. 1, Entry 820.]—*R. W. Webb.*

127. Kidd, F., and C. West. **Physiological pre-determination: the influence of the physiological condition of the seed upon the course of subsequent growth and upon the yield. I. The effects of soaking seeds in water.** Ann. Appl. Biol. 5: 1–10. *Pl. 1–2.* 1918.—The experiments described lead to the conclusions that soaking seed in distilled water previous to sowing may have a marked effect upon the subsequent growth of the plant, that a germination test cannot be relied upon in the least to give any criterion of what this effect may be, and that the nature of the effect is strongly specific, quite different results being obtained by similar treatment of closely allied plants.—*S. M. Zeller.*

128. Miller, Edwin C., and W. B. Coffman. **Comparative transpiration of corn and the sorghums.** Jour. Agric. Res. 13: 579–604. *Pl. 62–63, Fig. 1–13.* 1918.—When varieties of corn and sorghum were grown in large galvanized iron cans, it was found that any variety of corn always transpired more per plant than any sorghum, but the transpiration per unit area was greater in the case of the sorghum than in that of the corn, the difference being due to the extent of the leaf surfaces. Differences of transpiration were more marked after full leaf development and under severe climatic conditions.—*R. A. McGinty.*

MINERAL NUTRIENTS

129. Fenn, W. O. **The effects of electrolytes on gelatin and their biological significance. II. The effect of salts on the precipitation of acid and alkaline gelatin by alcohol. Antagonism.** Jour. Biol. Chem. 33: 439–451. *Fig. 1–6.* 1918.

130. Fenn, W. O. **The effects of electrolytes on gelatin and their biological significance. III. The effects of mixtures of salts on the precipitation of gelatin by alcohol. Antagonism.** Jour. Biol. Chem. 34: 141–160. *Fig. 1–9.* 1918.

131. FENN, W. O. **The effects of electrolytes on gelatin and their biological significance. IV. The precipitation of gelatin by mixtures of salts.** Jour. Biol. Chem. 34: 415–428. *Fig. 1–5.* 1918.

132. LOEB, JACQUES. **The influence of neutral salts, bases, and acids on the precipitability of gelatin by alcohol.** Jour. Biol. Chem. 34: 489–501. 1918.

133. LOEB, JACQUES. **Ionization of proteins and antagonistic salt action.** Jour. Biol. Chem. 33: 531–549. 1918.

134. LOEB, JACQUES. **The origin of the conception of physiologically balanced salt solutions.** Jour. Biol. Chem. 34: 503–504. 1918.

135. MILLAR, C. E. **Relation between biological activities in the presence of various salts and the concentration of the soil solution in different classes of soil.** Jour. Agric. Res. 13: 213–223. 1918.—From data obtained by the use of different soils containing varying amounts of salts and dried blood, the author concludes that it is improbable that in the ammonification of the dried blood, osmotic pressure is the governing factor. The nature of the soil used apparently modifies the effect of the various salts on ammonification to a considerable extent.—*R. A. McGinty.*

136. TOTTINGHAM, W. E. **The sulfur requirement of the red clover plant.** Jour. Biol. Chem. 36: 429–438. *Fig. 1–2.* 1918.

METABOLISM (GENERAL)

137. BERTHELOT, ALBERT. **Recherches sur la flore intestinale contribution a l'étude des microbes producteurs de phénol principaux caracteres du Bacillus phenologenes. [A study of intestinal microbes producing phenol, especially Bacillus phenologenes.]** Ann. Inst. Pasteur 32: 17–36. *Fig. 1–2.* 1918.—After referring briefly to the production of phenol by the organisms of the intestinal tract the author describes in detail the characteristics of the species mentioned above on a variety of culture media. On a culture medium containing tyrosin he was unable to determine the presence of any *P*-cresol but invariably, even in media slightly aerated, a definite test for phenol. Furthermore, the cultures showed a reddish tint analogous to that of phenol exposed to the air, and this appeared in all except the anaerobic cultures. Many data are given showing the influence of the culture medium upon the production of phenol.—*B. M. Duggar.*

138. BLISH, M. J. **A study of the non-protein nitrogen of wheat flour.** Jour. Biol. Chem. 33: 551–559. 1918.

139. CHICK, HARRIETTE, AND E. MARGARET HUME. **The effect of exposure to temperatures at or above 100°C. upon the substance (vitamine) whose deficiency in a diet causes polyneuritis in birds and beri-beri in man.** Proc. Roy. Soc. London B, 90: 60–68. 1918.—An exposure of wheat embryo to a temperature of 100°C. for two hours produced no significant loss in anti-neuritic "vitamine," but at a temperature of 120° there was swift destruction of the anti-neuritic properties.—*B. M. Duggar.*

140. CHICK, HARRIETTE, AND E. MARGARET HUME. **The distribution in wheat, rice, and maize grains of the substance, the deficiency of which in a diet causes polyneuritis in birds and beri-beri in man.** Proc. Roy. Soc. London B, 90: 44–60. 1918.

141. DUTCHER, R. ADAMS. **Vitamine studies. III. Observations on the curative properties of honey, nectar, and corn pollen in avian polyneuritis.** Jour. Biol. Chem. 36: 551–555. 1918.

142. DUTCHER, R. ADAMS, AND FERDINAND A. COLLATZ. **Vitamine studies II. Does water-soluble vitamine function as a catalase activator?** Jour. Biol. Chem. 36: 547–550. 1918.

143. Everest, Arthur Ernest. **The production of anthocyanine and anthocyanidins. Part III.** Proc. Roy. Soc. London B, 90: 251–265. 1918.—Continuing investigations begun several years earlier it is pointed out that evidence is required to determine whether anthocyan pigments produced in plants originate via flavonols or by direct synthesis, independent of the former. An elucidation of this point is the direction towards which the investigations have naturally turned in the present paper. A study of the *Viola* pigments has been begun with some results bearing upon the problem indicated. The work seems to indicate that in the variety "Black Knight" there occurs a glucoside of myricetin side by side with a glucoside of delphinidin, thus in the same flower an anthocyan pigment and a flavonol derivative from which it would be produced by reduction. The reactions of anthocyan pigments are considered in some detail. The author's anthocyanidin is shown to be identical with delphinidin. In further work it is proposed to determine whether or not the two classes of pigments, anthocyan, and flavone derivatives, occur attached to the same sugars.—*B. M. Duggar.*

144. Greig, E. D. W., and Dagmar F. Curjel. **Report on the anti-beri-beri vitamine content of three kinds of atta biscuits.** Indian Jour. Med. Res. 6: 56–67. 1918.—Fifteen per cent atta biscuit contains considerable amount of anti-beri-beri vitamine.—*R. W. Webb.*

145. Hogan, Albert G. **The nutritive properties of kafirin.** Jour. Biol. Chem. 33: 151–159. *Charts 1–4.* 1918.

146. Johns, Carl O., and Lewis H. Chernoff. **The globulin of buckwheat, Fagopyrum fagopyrum.** Jour. Biol. Chem. 34: 439–445. 1918.

147. Johns, Carl O., A. J. Finks, and C. E. F. Gersdorf. **Globulin of the cocoanut, Cocos nucifera. 1. Preparation of cocoanut globulin.** Distribution of the basic nitrogen in cocoanut globulin. Jour. Biol. Chem. 37: 149–153. 1919.—The globulin prepared contains all the basic amino acids necessary for maintenance and growth. The free amino acid is about equal to one-half the lysine nitrogen as determined in the Van Slyke analysis.—*B. M. Duggar.*

148. Johns, Carl O., and A. J. Finks. **Stizolobin of the Chinese velvet bean, Stizolobium niveum.** Jour. Biol. Chem. 34: 429–438. 1918.

149. Johns, Carl O., and D. Breese Jones. **The determination of tyrosine in proteins.** Jour. Biol. Chem. 36: 319–322. 1918.

150. Jones, D. Breese, and Carl O. Johns. **The hydrolysis of kafirin.** Jour. Biol. Chem. 36: 323–334. 1918.

151. Kuriyama, Shigenobu. **The physiological behavior of raffinose. II.** Jour. Biol. Chem. 34: 321–333. 1918.

152. Levene, P. A. **The structure of yeast nucleic acid. III. Ammonia hydrolysis.** Jour. Biol. Chem. 33: 425–428. *Fig. 1.* 1918.

153. Levene, P. A. **The structure of yeast nucleic acid. II. Uridine-phosphoric acid.** Jour. Biol. Chem. 33: 229–234. *Fig. 1–2.* 1918.

154. Levene, P. A., and C. J. West. **Lecithin. II. Preparation of pure lecithin; composition and stability of lecithin cadmium chloride.** Jour. Biol. Chem. 34: 175–186. 1918.

155. McCollum, E. V., N. Simonds, and H. T. Parsons. **Supplementary relationships between the proteins of certain seeds.** Jour. Biol. Chem. 37: 155–178. *Charts 1–77.* 1919.—Numerous data are given showing the degree to which the proteins from different seeds supplement each other, all experiments being conducted with rats.—*B. M. Duggar.*

156. McCOLLUM, E. V., N. SIMMONDS, AND H. T. PARSONS. **The dietary properties of the potato.** Jour. Biol. Chem. 36: 197–210. *Charts 1–7.* 1918.

157. OSBORNE, THOMAS B., AND LAFAYETTE B. MENDEL. **The vitamines in green foods.** Jour. Biol. Chem. 37: 187–200. *Charts 1–3.* 1919.—It is concluded that green vegetables are an important addition to the diet of man because such staples as meat, cereals, potatoes, sugar, and fats probably yield an insufficient quantity of either of the vitamines to meet the dietary requirements.—*B. M. Duggar.*

158. SUMNER, JAMES B. **The globulins of the Jack bean, Canavalia ensiformis.** Jour. Biol. Chem. 37: 137–141. *Pl. 1.* 1919.—A preliminary paper in which the author reports the isolation to two new crystalline globulins, named concanavalin A and concanavalin B, and of one new non-crystalline globulin—canavalin—from the Jack bean.—*B. M. Duggar.*

159. WALLIS, R. L. MACKENZIE. **Report upon the food value of the ground-nut.** Indian Jour. Med. Res. 6: 46–55. 1918.

160. OSBORNE, THOMAS B., AND LAFAYETTE B. MENDEL. **Nutritive factors in plant tissues. I. The protein factor in the seeds of cereals.** Jour. Biol. Chem. 34: 521–535. *Chart 1.* 1918.

161. PACINI, AUGUST J. P., AND DOROTHY WRIGHT RUSSELL. **The presence of a growth-producing substance in cultures of typhoid bacilli.** Jour. Biol. Chem. 34: 43–49. *Fig. 1–4.* 1918.

162. SAMPSON, HOMER C. **Chemical changes accompanying abscission in Coleus Blumei.** Bot. Gaz. 66: 32–53. 1918.—Using microchemical methods, the author finds that abscission of leaves in *Coleus Blumei* results from an excess amount of pectic acid which is formed by the conversion of cellulose into pectose and the further transformation of the pectose into pectin and pectic acid.—*R. A. McGinty.*

163. SHERMAN, H. C., AND JET C. WINTERS. **Efficiency of maize protein in adult human nutrition.** Jour. Biol. Chem. 35: 301–311. 1918.

164. STEENBOCK, H., P. W. BOUTWELL, AND HAZEL E. KENT. **Fat-soluble vitamine. I.** Jour. Biol. Chem. 35: 517–526. *Charts 1–16.* 1918.

165. STEENBOCK, H., HAZEL E. KENT, AND E. G. GROSS. **The dietary qualities of barley.** Jour. Biol. Chem. 35: 61–74. *Charts 1–20.* 1918.

166. SUGIURA, KANEMATSU, AND STANLEY R. BENEDICT. **The nutritive value of the banana.** Jour. Biol. Chem. 36: 171–189. *Charts 1–16.* 1918.

METABOLISM (NITROGEN)

167. BRADLEY, HAROLD C., AND M. STARR NICHOLS. **Nitrogen content of bacterial cells. I. Method.** Jour. Biol. Chem. 33: 525–529. 1918.

168. DAVIDSON, J. **Do seedlings reduce nitrate?** Jour. Biol. Chem. 37: 143–148. 1919.—Experiments on a considerable scale were arranged with seedlings of wheat, corn, barley, oats, rye, and rice, for the most part floated on solutions of sodium nitrate of a concentration of 1000 parts per million. Colorimetric tests for nitrite were made about twenty-four hours apart for several days. In general it is shown that nitrates are not reduced by seedlings in the outside medium as a result of their metabolic processes. Nitrate reduction, fluctuating in amount from day to day, does occur when the surfaces of the seeds come in contact with the salt solution, and the data indicate that such reduction is a result of bacterial activity.—*B. M. Duggar.*

169. **Fred, E. B., and Audrey Davenport.** **Influence of reaction on nitrogen-assimilating bacteria.** Jour. Agric. Res. 14: 317–336. *Fig. 1.* 1918.—Behavior of legume bacteria and *Azotobacter* toward small amounts of acid or alkali depends on the nature of the medium and the dissociation of the acid and alkali; the sensitiveness of various organisms to such reactions is determined.—*R. W. Webb.*

METABOLISM (ENZYME ACTION)

170. **Abderhalden, E., and H. Schaumann.** **Studien über die Beeinflussbarkeit der Wirkung einiger Fermente der Hefe durch Stoffe, die sich mit Alkohol aus der Hefezelle abtrennen lassen. [The influence of alcohol-soluble substances from the yeast cell on the activity of certain yeast enzymes.]** Fermentforschung 2: 120–150. *Pl. 1–2.* 1918.

171. **Abderhalden, E., and A. Fodor.** **Forschungen über Fermentwirkung. III. Mitteilung: Weitere Studien über die Adsorption von Aminosäuren und Polypeptiden und ferner von verschiedenen Kohlehydraten durch Tierkohle. [Enzyme action. Further studies on adsorption of amino acids, polypeptids and carbohydrates by animal charcoal.]** Fermentforschung 2: 151–166. *Fig. 1–4.* 1918.

172. **Abderhalden, E., and A. Fodor.** **Forschungen über Fermentwirkung. IV. Mitteilung: Weitere Studien über die Adsorption der Gemische von Aminosauren mit Polypeptiden und anderen Substanzen. Das Verhalten von Aminosauren und Polypeptiden gegenüber Eiweisslösungen, Blutserum und bei der Koagulation von Solen. V. Mitteilung: Ultrafiltrationsversuche mit Mischungen bestehend aus Aminosäuren bzw. Polypeptiden und Hefemazerationssäften. Stützen für den kolloiden Zustand der Fermente und Erweiterung der Adsorptionstheorie. [Enzyme action. IV. Adsorption of mixtures of amino acids and polypeptids and the relation of these to albumin solutions and blood serum and to the coagulation of soles. V. Ultrafiltration with mixtures of amino acids, polypeptids and macerated yeast juice. The colloidal condition of enzymes.]** Fermentforschung 2: 211–250. *1 fig.* 1918.

173. **Crocker, William, and George T. Harrington.** **Catalase and oxidase content of seeds in relation to their dormancy, age, vitality, and respiration.** Jour. Agric. Res. 15: 137–174. *Fig. 1–3.* 1918.—Experimental methods and work are cited, and an extensive study is made of catalase and oxidase of many seeds under various conditions.—*R. W. Webb.*

174. **Euler, H., O. Svanberg, and S. Heintze.** **Quantitative Bestimmungen der enzymatischen Tätigkeit in lebenden Zellen. I. [Quantitative determinations of enzyme activity in living cells.]** Fermentforschung 2: 194–199. 1918.

175. **Falk, I. S.** **The influence of certain salts on enzyme action.** Jour. Biol. Chem. 36: 229–247. 1918.

176. **Jewell, Minna D., and Howard B. Lewis.** **The occurrence of lichenase in the digestive tract of invertebrates.** Jour. Biol. Chem. 33: 161–167. 1918.

177. **Sherman, H. C., A. W. Thomas, and M. E. Baldwin.** **Influence of hydrogen ion concentration upon enzyme activity of three typical amylases.** Proc. Soc. Exp. Biol. Med. 16: 17–18. 1918—"Pancreatic and malt amylase and the amylase of *Aspergillus oryzae* (prepared from taka-diastase) have been selected as representative of the starch-splitting enzymes of the higher animals, higher plants, and fungi respectively. Laboratory methods for the purification of each of these amylases have been described in previous papers. The present experiments were performed with enzyme preparations which had been purified in accordance with these methods. The experiments establish for each of the three amylases the limits of hydrogen ion concentration within which any enzymic activity is shown, and the form of the curve representing the activities at all concentrations of hydrogen ion between these limits. The investigation was carried out with the aid of a grant from the Carnegie Institution of Washington."—*H. C. Sherman.*

178. SVANBERG, OLOF. **Enzymatische Untersuchungen einer Torula-Hefe. [Enzymatic studies of a Torula.]** Fermentforschung 2: 201–211. *Fig. 1.* 1918.—The author details experiments with a *Torula*, not previously investigated, in respect to determinations of the velocity of fermentation, the increase in cell number, and the inversion capacity per cell and per gram dry weight. It is shown that ferment capacity is much like that of known culture yeasts. No organic phosphate compounds could be identified.—*B. M. Duggar.*

179. WOLFF, J., AND B. GESLIN. **Étude des produits de dégradation diastasique de l'inuline dans la racine de chicorée. [Decomposition products of inuline in chicory roots by enzyme action.].** Ann. Inst. Pasteur 32: 71–96. 1918.—It is shown that aside from inulin there may be found in the plant investigated certain products of less molecular weight which are designated inulids. These bodies are non-reducing and they are attacked by certain yeasts, whereas inulin is not. The roots harvested one month also exhibit a carbohydrase (inulase) slightly active and easily decomposable, likewise a very small amount of reducing sugar. From a study of roots which had been stored two months the author concludes that there is strong presumptive evidence indicating the existence in the root as well as in certain yeasts of the same enzyme acting upon inulids and not upon inulin. The inulin ferment invariably acts slowly both within the plant and through *in vitro* experiments. The inulids studied are tentatively grouped in three classes according to the quantities of alcohol yielded upon fermentation.—*B. M. Duggar.*

REGENERATION

180. BRIERLEY, W. B. **On cell-regeneration in Botrytis cinerea.** Ann. Bot. 32: 601–604. *Fig. 1–3.* 1918.—Types of injury which stimulate a healing reaction are grouped as (1) acute flexion of cells; (2) punctures or minute wounds; (3) relatively large lesions. Two distinct regenerative processes are involved, i.e., (1) restitution of the original cell wall, and (2) formation of a completely new membrane about the escaped protoplasm. Since the protoplasm still lives when a part is thus in a free plasmodial state the Swedish conception of mycoplasm should not be ignored. The author refers to an unpublished work in which he describes naked hyphae of *Botrytis cinerea* existing as free protoplasmic substance in the tissues of *Aesculus Paria.*—*S. M. Zeller.*

181. LOEB, JACQUES. **Healthy and sick specimens of Bryophyllum calycinum.** Bot. Gaz. 66: 69. 1918.—Replying to a criticism of his views in regard to the production of shoots by the leaves of abnormal plants of *B. calycinum*, the author points out that the photograph of the plant referred to by Miss E. L. Braun in her paper (Bot. Gaz. 65: 191. 1918), shows it to have been an abnormal and not a normal plant, as assumed, and that it was therefore not exceptional in producing shoots from the leaves while the latter were still attached to the parent.—*R. A. McGinty.*

182. LOEB, JACQUES. **The chemical mechanism of regeneration.** Ann. Inst. Pasteur 32: 1–16. *Fig. 1–3.* 1918.—The material in this paper has been previously abstracted. [Bot. Absts. 1, Entries 68, 736].

TEMPERATURE RELATIONS

183. HARTLEY, CARL. **Stem lesions caused by excessive heat.** Jour. Agric. Res. 14: 595–604. *Fig. 1.* 1918.

184. VINALL, H. N., AND H. R. REED. **Effect of temperature and other meteorological factors on the growth of sorghums.** Jour. Agric. Res. 13: 133–147. *Pl. 11–12.* 1918.—From observations upon sorghums growing in localities with widely varying meteorological conditions, the author concludes that due to its semitropical adaptations, sorghum will not thrive in regions of low temperatures and that a high percentage of sunshine is probably an important factor in growth. The effect of weather conditions upon germination, flowering and fruiting, yield of seed, and number of leaves per plant is considered.—*R. A. McGinty.*

LIGHT RELATIONS

185. Laroquette, Miramond de. **Experiences sur l'action bactéricide de la lumière solaire (lumière blanche totale et lumières partielles ou de couleurs). [The bactericidal action of sunlight and of light of various colors.]** Ann. Pasteur 32: 170–192. *Fig. 1–3.* 1918.—The author was impressed by the necessity of investigating more completely the action of light of various wave lengths aside from ultraviolet, to which so much attention has already been given. For a considerable number of the experiments use was made of houses constructed with glass of different colors, installed at Algiers, for an extended investigation of the effects of blue, green yellow, and red lights upon various organisms. A spectrographic examination of the glass was made and the chemical values determined. Extensive experiments were made with cultures of six species of microorganisms on various media. In general, it is stated that sunlight is only bactericidal when intense, or when long continued, acting especially at the surfaces of dry media and in the air, whereas in liquid media there is much slower action. White light is much more injurious than "partial" light of any color. Diffuse light is insufficient. Of the colored lights indicated blue is slowly bactericidal but much less than white. After the blue follow respectively yellow, red, and green. It is concluded that the visible part of the solar spectrum is the most active, the elimination of ultraviolet scarcely sensibly diminishing the injurious action. The bactericidal power lies both in the chemical and in the dehydrating action. In a practical way, in hygiene and therapeutics, little stress may be laid upon the bactericidal action of sunlight, owing to its small penetrating power. Similarly, in heliotherapy it is only cutaneous affections which may be successfully treated.—*B. M. Duggar.*

186. Schanz, Fritz. **Wirkungen des Lichts auf die Pflanze. [The effects of light on plants.]** Biol. Zentralbl. 38: 283–296. *Fig. 1–5.* 1918.—After a discussion of the effect of ultraviolet light upon certain proteins the author proceeds to consider the influence of light of various wave lengths upon the activities of the cell and of the plant in general. Special attention is drawn to the character of the daylight to which plants are exposed at different periods of the year, and to such light modified by the prevalent atmospheric conditions. A few simple experiments were made, and the results of these, together with observations at various altitudes, led to the conclusion that in general the low and sturdy vegetation form of the high mountains is promoted by the shorter wave lengths. As this stimulus declines toward the plains, so the increased length of the plant becomes more marked.—*B. M. Duggar.*

187. Sierp, Hermann. **Über die Lichtquellen bei pflanzenphysiologischen Versuchen. [Sources of light for plant physiological experiments.]** Biol. Zentralbl. 38: 221–257. *Fig. 1–10.* 1918.—The author presents an extensive review of the early literature relating to artificial sources of light. The difficulties of the subject are set forth and the directions in which the most practical development is to be anticipated are indicated.—*B. M. Duggar.*

TOXIC AGENTS

188. Allard, H. A. **Effects of various salts, acids, germicides, etc., upon the infectivity of the virus causing the mosaic disease of tobacco.** Jour. Agric. Res. 13: 619–637. 1918.—The author gives the results of extensive experiments along the line indicated. Formaldehyde and strong alcohol were found to destroy the infective principle quickly, alcohol of 30–50 per cent was destructive only after an interval of some days, while many other substances affected the "virus" to a less degree or not at all. [See Bot. Absts. 1, Entry 1004.]—*R. A. McGinty.*

MISCELLANEOUS

189. Bock, Joseph C., and Standley R. Benedict. **A new form of colorimeter.** Jour. Biol. Chem. 35: 227–230. *Fig. 1–3.* 1918.

190. Cullen, Glenn E., and J. Harold Austin. **Hydrogen ion concentrations of various indicator end-points in dilute sodium hypochlorite solutions.** Jour. Biol. Chem. 34: 553–568. *Fig. 1.* 1918.

191. HARRIS, J. ARTHUR. **Secondary parasitism in Phoradendron.** Bot. Gaz. 66: 275–276. 1918.—By the use of data (which are, however, stated to be insufficient) the author points out that the parasitism of *Phorandendron californicum* on *P. flavescens*, recently cited by Brown is just the reverse of what might be expected if successful parasitism were based upon higher osmotic concentration in the tissue fluids of the parasite.—*R. A. McGinty.*

192. HOLMES, M. G. **A study in the anatomy of hazel-wood with reference to conductivity of water.** Ann. Bot. 32: 553–567. *Fig. 1–10.* 1918.—A statistical method of investigating the constitution of wood is described from the standpoint of its efficiency for conducting water. The number, size, and distribution of the elements in the hazelwood are recorded in a graphical form. This method is intended to serve as a basis for correlating with anatomy the facts of specific conductivity obtained by experiment. In stool shoots of the hazel the figures have shown a very considerable variation in the constitution of the wood formed during the first season. On the whole there is a general decline in total conductivity and a general rise in specific conductivity from the base of the shoot to its distal end, for the wood fibers towards the base are supplied with a greater proportion of mechanical elements for support rather than water conduction. [See Bot. Absts. 1, Entry 1592.]—*S. M. Zeller.*

193. MAGROU, J. **L'immunité dans la symbiose. [Immunity and symbiosis.]** Ann. Inst. Pasteur 32: 37–47. *Pl. 1.* 1918.—The author discusses the endophytic parasitism in orchids, the occurrence in wild species of *Solanum* of a parasite of similar habits, and the conditions under which *Solanum tuberosum* may be inoculated with the fungus characteristic of wild forms. In reality cultivated species of *Solanum* have acquired a resistance to the penetration of various fungi by a tissue modification which is primarily mechanical, but this does not eliminate the specific endophyte of this host. The potato, is unable however, to tolerate long the existence of the parasitic endophyte and after penetration immunity is exhibited by the rapid degeneration of the parasite. The author considers this destruction of the parasite to be a phagocytic process. In all cases the infestation is strictly limited to superficial tissues of the young roots in regions completely differentiated and above the level of the zone of root hairs. The infestation does not extend to the tubers and to aerial parts. The author believes it possible to draw a close analogy between immunity in plants and in animals.—*B. M. Duggar.*

194. WILLIAMS, MAUD. **Absorption of gold from colloidal solutions by fungi.** Ann. Bot. 32: 531–534. 1918.—Conidia of *Penicillium glaucum* and *Oidium lactis* germinate and the mycelium develops in solutions of colloidal gold which contain tannin or gum arabic. During growth the fungi remove the metal from the solution. Retention of the gold occurs in walls which are not cuticularized. When masses of dead fungous mycelium are introduced into the solutions the process of absorption goes on more irregularly. The more diffusible solutions color the fungus more quickly than those with a lower rate of diffusion. The accumulation of gold produces a blue coloration. The process is not explained.—*S. M. Zeller.*

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

BRYOPHYTES

195. ANDREWS, A. LEROY. **Bryological notes, IV. A new hybrid in Physcomitrium.** Torreya 18: 52–54. 1918.—A number of species of annual Funariaceae were collected upon the silt of a reclaimed marsh at Ithaca, New York. Among them were specimens obviously hybrids between *Physcomitrella patens*, ♀, and *Physcomitrium turbinatum*, ♂. A description of the sporophyte, the only hybrid portion, is given, and a few notes upon moss hybrids in general. In footnotes a record is made of the first collection of *Physcomitrium Hookeri* east of Ohio, and of certain distinguishing features of the species *Physcomitrella patens* and *Aphanorrhegma serratum.*—*E. B. Chamberlain.*

LICHENS

196. MOXLEY, GEORGE L. **Additions to the lichen flora of Southern California.** Bull. Southern California Acad. Sci. 17: 61–62. 1918.—Announcement as previously unreported from Southern California of three lichens, viz., *Parmelia dubia*, *Physcia obscura* var. *virella*, and *Physcia caesia*.—*W. A. Setchell.*

ALGAE

197. GARDNER, NATHANIEL LYON. **New Pacific coast marine algae II.** Univ. California Pub. Bot. 6: 429–454. *Pl. 36–37.* 1918.—The following new species of Setchell and Gardner are described and illustrated: *Chlorogloea lutea*, *Xenococcus Chaetomorphae*, *Dermocarpa hemisphaerica*, *D. pacifica*, *D. suffulta*, *D. sphaeroidea*, *Hyella Littorinae*, *H. linearis*, *H. socialis*, *Radaisia Laminariae*, *R. clavata*, *R. subimmersa*, and *R. epiphytica*. The new combination *Chlorogloea conferta* (Kuetz.) Setchell and Gardner is proposed, and a note as to the identity of *Sargassum dissectifolium* Setchell and Gardner with the previously published *S. Palmeri* Grunow is added.—*W. A. Setchell.*

198. GARDNER, NATHANIEL LYON. **New Pacific coast marine algae III.** Univ. California Pub. Bot. 6: 455–486. *Pl. 38–41.* 1918.—The following new species, or new combinations, of Setchell and Gardner are described and illustrated: *Anacystis elabens* (Kuetz.), *Dermocarpa protea*, *D. sphaerica*, *Xenococcus acervatus*, *X. Cladophorae*, *X. Gilkeyae*, *X. pyriformis*, *Pleurocapsa entophysaloides*, *P. gloeocapsoides*, *Arthrospira breviarticulata*, *Phormidium hormoides*, *Lyngbya Willei*, *Symploca funicularis*, *S. aeruginosa*, *Microcoleus Weeksii*, *M. confluens*, *Calothrix rectangularis*, *C. robusta*, *Dichothrix seriata*, *D. minima*, *Rivularia mamillata*, and *Brachytrichia affinis*.—*W. A. Setchell.*

FUNGI

199. WÖLTJE, WILHELM. **Unterscheidung einiger Penicillium-species nach physiologischen Merkmalen. [Separation of species of Penicillium by physiological characters.]**—Centralbl. Bakt. 48^{II}: 97–130. 1918.—The author has restudied certain species of *Penicillium* under carefully controlled cultural conditions. The literature of characterization in the genus *Penicillium* is discussed and the conclusion reached that the cultural basis for species, as proposed hitherto, has not been sufficiently standardized. As a result of careful measurement of parts, the author concludes that the morphological contrasts are too small for satisfactory separation of forms really characteristically different. He finds the color of the colony too greatly subject to variation to be reliable and to make too great demands for discrimination on the part of the worker. He, therefore, concludes that an elaborate presentation of many characters upon numerous media is necessary to establish a stable nomenclature and that these characteristics should be predominantly physiological.—For this purpose, comparative tables give the results of growth upon wort agar, wort gelatine; fluid synthetic media with nitrogen as nitrates, ammonia, and asparagin, the asparagin medium with inhibitors added such as sodium chloride, acetic acid, and lactic acid; milk, cellulose media, apples, pears, oranges, and onions. Heat tolerances are also given. The basal synthetic solution was: distilled water 100 cc., dipotassium phosphate 0.5 g., magnesium sulphate 0.25 g., cane sugar 7.5 g. The comparatively high concentration of this basal solution should be noted. Fractional sterilization was emphasized.—The named species included in the study are *Penicillium glaucum*, *P. corymbiferum*, *P. viridicatum*, *P. roqueforti*, *P. italicum*, *P. olivaceum* (*P. digitatum*), *P. purpurogenum*, and *P. luteum*. In addition 10 species are designated by Roman numerals.—The data are also collected into species characterizations which exhibit the weaknesses of the method. Each form receives a series of physiological characters each based upon results of perhaps two experiments. Wöltje finds it impossible to identify his own strains with previously described species, hence he concludes that there are a great number of undescribed species which can not be separated morphologically but for which physiological contrasts may be obtained by elaborate cultural study.—*Charles Thom.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

200. ANONYMOUS. **Variété nouvelle d'"Aster."** [**New variety of Aster.**] Naturaliste Canadien **44**: 152–153. 1918.—The description of *Aster linariifolius* L. var. *Victorinii* Fernald is reprinted from Rhodora **14**: 194. 1914.—*Adele Lewis Grant.*

201. BUSH, B. F. **The genus Euthamia in Missouri.** Amer. Midland Nat. **5**: 157–177. 1918.—The author gives a detailed key and descriptions of the four species of *Euthamia* found in Missouri, *E. hirtella* Greene, *E. leptocephala* (*T. & G.*) *Greene, E. media* Greene, and *E. gymnospermoides* Greene. Two new species are described namely, *E. fastigiata,* occurring in the southeastern states, and *E. bracteata* found in the west and northwest. A number of new combinations are made.—*Adele Lewis Grant.*

202. CHURCHILL, J. R. **A smooth-fruited form of Asclepias syriaca.** Rhodora **20**: 206–207. 1918.—*Asclepias syriaca* L. forma *inermis* is described from Massachusetts.—*J. M. Greenman.*

203. CUBITT, G. E. S. **Gordonia concentricicatrix, Burkill, (Kelat samak, Samak pulut, Kelat merah—Malay).** Jour. Straits Branch Roy. Asiatic Soc., **78**: 49–50. *Pl. 3.* 1918.—Further data is recorded about this important economic species which was published recently (*ibid.* **76**: 152–153. 1917).—*Adele Lewis Grant.*

204. DAVIDSON, ANSTRUTHER. **Gnaphalium beneolens, n. sp.** Bull. Southern California Acad. Sci., **17**: 17. 1918.—A new species, *Gnaphalium beneolens,* occurring in southern California, is described and illustrated.—*Adele Lewis Grant.*

205. FARWELL, O. A. **The Trillium grandiflorum group.** Rept. Michigan Acad. Sci. **20**: 155–159. 1918.—A key to the species, varieties and forms in this group is given, and one new species, *T. Chanleri,* one new variety, and fourteen new forms are described. All of these plants occur in a small section of woodland in Farmington township, Oakland Co., Michigan. —*Adele Lewis Grant.*

206. FARWELL, O. A. **Notes on the Michigan Flora.** Rept. Michigan Acad. Sci. **20**: 161–195. 1918.—This is the first of a proposed series of papers on rare or interesting plants in Michigan. Several plants heretofore unknown to the flora of that state are recorded, new localities given and ranges extended for many others. One new species, *Polygonatum melleum,* and thirteen new varieties are described, and forty-one new combinations are listed.—*Adele Lewis Grant.*

207. FARWELL, O. A. **The yellow flowered Cypripediums.** Rept. Michigan Acad. Sci. **20**: 197–198. 1918.—The author distinguishes three distinct forms of the Yellow Ladies Slipper occurring in Michigan. *C. pubescens* Willd. var. *Makasin* (*C. Makasin*) is described as new.—*Adele Lewis Grant.*

208. FERNALD, M. L. **Some North American representatives of Braya humilis.** Rhodora **20**: 201–203. 1918.—The author presents a brief discussion of the Cruciferous plant *Braya humilis* and its immediate allies, and includes two new combinations namely, *Braya humilis* (C. A. Meyer) Robinson, var. *novae-angliae* (*Pilosella novae-angliae* Rydb.) and *Braya Richardsonii* (*Pillosella Richardsonii* Rydb.).—*J. M. Greenman.*

209. FITZGERALD, WILLIAM VINCENT. **The botany of the Kimberleys, North-west Australia.** Jour. and Proc. Roy. Soc. W. Australia **3**: 102–224. 1918.—Mr. Fitzgerald's paper deals with a part of Australia the flora of which is incompletely known. Six hundred and seventy-six species of ferns and flowering plants are recorded, including two genera, eighty-eight species, and five varieties which are described as new to science. The following is a

list of the new plants described: *Cycas furfuracea, Triglochin pterocarpa, Xerochloa imberis* R. Br. var. *repens, Eriachne pauciflora, Cyperus holoschoenus* R. Br. var. *viscida, Fimbristylis pilifera, F. oligocephala, F. arthrostyloides, Crosslandia setifolia* gen. et sp. nov. Cyperacearum, *Scirpus isdellensis, Rhynchospora affinis, Haemodorum longifolium, H. flaviflorum, Grevillea miniata, G. heteroneura, G. erythroclada, Hakea Morrisoniana, Loranthus ferruginiflorus, L. biangulatus, Ptilotus longistachyus, P. Johnstonianus, Calandrinia Tepperiana, Cassytha strigosa, Cassia neurophylla, C. cladophylla, Jacksonia petrophiloides, J. aculeata, Crotalaria membranacea, Psoralea cuneata, P. virens, Tephrosia conspicua, T. stipuligera, Atylosia lanceolata, Tribulus affinis, T. curvicarpus, Boronia pauciflora, Euphorbia distans, E. comans, E. cinerea, E. chrysochaeta, Bridelia phyllanthoides, Petalostigma humilis, Phyllanthus polycladus, Mallotus derbyensis, Buchanania oblongifolia, Cryptandra intratropica, Triumfetta reflexa, Sida Hackettiana, Abutilon Andrewsianum, A. propinquum, Hibiscus zonatus* F. v. M. var. *spinulosa, Brockmania membranacea* gen et sp. nov. Malvacearum, *Sterculia viscidula, S. tuberculata, S. viridiflora, S. decipiens, Helicteres rhynchocarpa, Nesaea repens, Terminalia Hadleyana, T. chlorocarpa, T. biangulata, T. Rogersii, Melaleuca Crosslandiana, M. argentea, M. Loguei, Fenzlia phebalioides, Diospyros nitens, Mitrasacme lepidocalyx, M. hispida, Marsdenia Brockmaniana, Ehretia urceolata, Heliotropium flaviflorum, Solanum Cunninghamii, Stemodia flaccida, Josehinia papillosa, Utricularia charnleyensis, Pityrodia obliqua, Goodenia linifolia, G. propinqua, Calogyne Heppleana, Scaevola scabrida, S. stenostachya, S. decipiens, Dampiera conospermoides, Stylidium cordifolium, S. rubriscapum, S. irriguum, S. claytonioides, Olearia aspera, Blumea pungens, B. prostrata, Pluchea tetranthera* F. v. M. var. *cinerea*, and *Pterocaulon globuliflorus.—J. M. Greenman.*

210. Gates, Reginald Ruggles. **A new evening primrose. Oenothera novae-scotiae.** Proc. and Trans. Nova Scotia Inst. Sci. **14**: 141–145. *2 fig.* 1918.—Gates describes and illustrates a new species of evening primrose, *Oenothera novae-scotiae*, grown from seeds collected on North Mountain, near Middleton, Nova Scotia. The type is deposited in the Herbarium of the University of California.—*J. M. Greenman.*

211. Gates, R. Ruggles. **A systematic analytical study of certain North American Convallariaceae, considered in regard to their origin through discontinuous variation.** Ann. Bot. 32: 253–257. 1918.—This article, according to the author, is a précis of the main points of a paper to be published after the war. [See Bot. Absts. 1, Entry 478.]—*Adele Lewis Grant.*

212. Hill, Arthur W. **The genus Caltha in the southern hemisphere.** Ann. Bot. 32: 421–435. *Fig. 1-10.* 1918.—Eleven species in the genus *Caltha* are treated in this paper, three of which are described as new. All of these belong to the section *Psychrophila*, based primarily on the development of the auricles of the leaf laminae forming upturned or erect appendages. These appendages are figured for most of the species. Of the new species described, *C. alata* and *C. involuta* are from South America and *C. phylloptera* is from Tasmania.—*Adele Lewis Grant.*

213. Koidzumi, Geniti. **Contributiones ad floram Asiae Orientalis** [Contributions to a flora of eastern Asia]. Bot. Mag. Tôkyô 32: 53–63, 134–138. 1918.—This is a continuation from Vol. 31: 262 of the same publication. The following new species and new varieties are described, all of which occur in Japan: *Myoporum boninense, Carex siroumensis, C. tenuiseta* Fr. var. *brevisquama, C. yesoensis, C. boninensis, Callicarpa glabra, C. Nishimurae, Prunus chikusiensis, Oxycoccoides japonicus* Nakai γ *ovatus, O. japonicus* δ *serrulatus, Artemesia glomerata* Ledeb. var. *pedunculosa, Phyllodoce caerulea* Bab. var. *yesoensis, P. alpina, Achillea pulchra, Rosa adenochaeta, Rubus Grayanus* Maxim. var. *chaetophorus, Hypericum ovalifolium, Salix pauciflora, S. kurilensis, Poa misera* Koidz. var. *alpina, Oxytropis japonica* Maxim. var. *sericea, Artemisia norvegica* Fries. var. *villosa, Arundinella anomala* Steud. var. *glauca, Stachyurus macrocarpus, S. lancifolius, Psychotria serpens* L. var. *macrophylla, Fatsia oligocarpella, Microstylis boninensis, Hydrangea Kowagoeana*, and *Juniperus lutchuensis. Eriophorum Scheuchzeri* Hoppe, *Gentiana glauca* Pall., and *Sparganium submuticum* Neum. are listed as being new to the flora of Japan.—*Adele Lewis Grant.*

214. LUNELL, J. **Enumerantur plantae Dakotae Septentrionalis vasculares.—XIV. [Enumeration of the vascular plants of North Dakota.]**. Amer. Midland Nat. 5: 233–241. 1918. —The present article consists of a continuation of the appendix to a series of papers published under the above title. Descriptions are given of two new species and four new varieties from North Dakota namely, *Amelanchier leptodendron*, *Scrophularia dakotana*, *Peritoma serrulatum* var. *clavatum*, *Laciniaria scariosa* var. *inconcinna*, *Arnica pedunculata* var. *monocephala* (*A. monocephala* Rydb.), and *Senecio canus* var. *eradiatus*.—*J. M. Greenman.*

215. MILLSPAUGH, C. F., AND EARL E. SHERFF. **New species of Xanthium and Solidago.** Field Mus. Nat. Hist. Bot. Ser. 4: 1–7. *Pl. 1–6.* 1918.—*Xanthium leptocarpum*, *X. arcuatum*, *X. cylindricum*, *X. crassifolium*, *X. acutilobum*, and *Solidago emarginata* are described as new. —*J. M. Greenman.*

216. MIYABE, KINGO, AND YUSHUN KUDO. **Materials for a flora of Hokkaido. VIII.** Trans. Sapporo Nat. Hist. Soc. 7: 23–35. 1918.—The present article on the flora of Hokkaido contains many notes on the distribution of plants beyond the limited area referred to by the title. Several plants are listed as being new to Hokkaido and the following new species and new forms are described: *Dryopteris okushirensis*, *Carex flaccidior* (*C. eleusinoides* var. *flaccidior* Fr. Schm.), *Ranunculus trichophyllus* Chaix, forma *nemorensis*, *R. trichophyllus* Chaix, forma *kushirensis*.—*Adele Lewis Grant.*

217. NAKAI, TAKENOSHIN. **Notulae ad plantas Japoniae et Koreae XVI, XVII.** [Notes on the plants of Japan and Korea. XVI, XVII.] Bot. Mag. Tôkyô 32: 28–37, 103, 110. 1918.— The sixteenth and seventeenth numbers of this series of articles on the plants of Japan and Korea contain descriptions of eighteen new species and two new varieties. Unless otherwise noted, all the descriptions are written by Nakai. The new plants ascribed to Korea are *Saxifraga Furumii*, *Fagus multinervis*, *Abelia coreana*, *Aster Oharai*, *Alsine macrocarpa* Fenzl. var. *koreana*, and *Salix hallaisanensis* Léveillé var. *longifolia*. The rest occur in Japan, and are as follows: *Pyrus aromatica* Kikuchi & Nakai, *P. hondoensis* Nakai & Kikuchi, *Corydalis filistipes*, *Opulaster insularis*, *Cotoneaster Wilsonii*, *Rubus takesimensis*, *Prunus takesimensis*, *Phellodendron insulare*, *Acer takesimense*, *Viola insularis*, *Abelia insularis*, *Chrysanthemum lucidum*, *Pyrus crassipes* Kikuchi & Nakai, and *Osmunthus rigidus*. The last two are cultivated in Japan but their origin is unknown.—*Adele Lewis Grant.*

218. NAKAI, TAKENOSHIN. **Praecursores ad floram sylvaticam Koreanam. X.** [A basis for a ligneus flora of Korea]. Bot. Mag. Tôkyô 32: 113–133. 1918.—The present number of this series of articles on the woody flora of Korea discusses *Oleaceae*. Keys to the genera and species occurring in Korea are given and the following new species, new varieties, and new combinations are included: *Ligustrum foliosum*, *L. salicinum* (*L. ciliatum* var. *salicinum* Nakai), *Syringa dilatata*, *S. micrantha*, *S. Kamibayashii*, *S. venosa* from Korea, and *S. buxifolia* occurring in China.—*Adele Lewis Grant.*

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ENTRIES 219-370

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

219. BATTEN, LILY. **Observations on the ecology of Epilobium hirsutum.** Jour. Ecol. **6**: 161-177. *55 fig.* Nov., 1918.—Plants of *Epilobium hirsutum* proved themselves capable of responding to external stimuli in the development, early in spring, of a phellogen layer capable of producing cork, concentric layers of aerenchyma, non-concentric aerenchyma, or alternate layers of phelloid and non-phelloid cells. The nature of the response was found to depend directly upon the environment of the plant and the position of the organ concerned, the rhizome showing most plasticity. Plants from dry habitats where they had no aerenchymatous tissue when transferred to water or mud showed in one vegetative season the development of aerenchyma on all rhizoids in mud or water. A transfer from wet to dry habitats showed less complete response and "produced concentric layers of aerenchyma in the part of the shoot below the soil level, although its formation was no longer essential to the life of the plant."

Seeds from water-grown plants with aerenchymatous tissue produced seedlings which in dry habitats showed no trace of aerenchyma. It was shown also that the seeds would germinate either in moist soil or below water level but that the latter gave weak seedlings, the best results coming from a generous supply of moisture without submergence.—*Geo. D. Fuller.*

220. COCKAYNE, L. **The importance of plant ecology with regard to agriculture.** New Zealand Jour. Sci. Technol. **1918**: 70-74. 1918.—The author emphasizes the importance of an intensive study of the plant communities that concern the farmer, citing as an example the tussock grassland, the most extensive of New Zealand pastures. The relation of this plant association to the various factors of its environment, its distribution and its variability are as yet little known and yet such knowledge is most essential to its better management and its higher productivity. Burning has been practiced in order that it may give better results in grazing, although it has not been shown what are the permanent effects upon the duration of the grasses. Even the racial purity of the principal grass, *Poa Colensoi* is not established, in fact, there is evidence that there is included under this name a complex of races differing much in value to the sheep farmer.—The control of the sand dune area is mentioned as another problem essentially ecological in nature but of great economic importance to the farming community. The final point is that nothing is more urgently needed in the interests of New Zealand agriculture than an agricultural survey, conducted along ecological lines, of all lands with a view to their accurate classification for various lines of agricultural development.—*Geo. D. Fuller.*

221. COKER, R. E. **Principles and problems of fish culture in ponds.** Scientific Monthly 7: 120–129, *2 fig.* Aug., 1918.—This paper is of much interest to plant ecologists, for it appears that pisciculture is in large part applied plant ecology. Plants are the chief oxygenators in confined ponds, but as yet little is known as to the value of one species over another in oxygenation, except that submerged evergreens with finely divided leaves are probably most satisfactory. While it is known that plants directly or indirectly are the basis of fish food, we are just beginning to determine which species have the greater food values. The problem of the optimum association of species in a pond is also of the greatest importance.—*H. C. Cowles.*

222. EMIG, W. H. **Mosses as rock builders.** Bryologist 21: 25–27. *Pl. 15.* 1918.—Mosses, particularly *Didymodon tophaceus* and *Philonotis calcarea*, have played an important part in the development of the travertine deposits in the Arbuckle Mountains, Oklahoma. The travertine is deposited along streams, principally in connection with water-falls. It is formed by the accumulation on mosses and other water plants of calcium carbonate, which is said to be precipitated from aqueous solution mainly as a result of the diffusion into the air of carbonic acid gas from evaporating water surfaces. The mosses act only indirectly in the precipitation, principally by supplying a larger absorptive and adsorptive surface for the evaporation of the calcareous solution.—*G. E. Nichols.*

223. FERNALD, M. L. **The geographic affinities of the vascular floras of New England, the Maritime Provinces and Newfoundland.** Amer. Jour. Bot. 5: 219–247. *3 pl.* May, 1918.—The region in question, with an area of about 200,000 square miles, possesses an indigenous vascular flora of more than 2800 species and varieties, practically all of which are post-glacial immigrants. Knowledge concerning this flora is not yet sufficiently complete to permit accurate deductions regarding its geographic origin, but the known affinities of certain elements with floras of other regions suggest many problems. In discussing these affinities, emphasis is laid on species of discontinuous range; it is to these, rather than to widely distributed species of nearly continuous distribution over large areas, that the greatest phytogeographical interest attaches. Considering the flora of this region in relation to floras in other parts of North America, attention is called to the coastal plain element, the Mississippi basin element, the western prairie-plains element, and the western subsaline element (temperate American affinities), and to the circumpolar, Greenland-Laborador, and several northwestern elements (boreal affinities). Considering the flora here in relation to floras outside of North America, attention is directed to several distinct Asian, Eurasian, and European affinities, and to affinities with the floras of South America, Polynesia, Australia, and even Africa. A number of illustrative observations are introduced to show the need of further investigations, both extensive and intensive, within the region under discussion.—*G. E. Nichols.*

224. KARSTEN, G. **Uber Kompasspflanzen. [On compass plants.]** Flora 111-112: 48–59. *3 pl.* 1918.—Author tested by means of a thermoelectric couple the temperature of leaves of *Lactuca scariola* in different positions, finding that vertical leaves perpendicular to the rays of the sun were 7.6° warmer than those parallel to the rays, that horizontal leaves were 3.6° warmer than vertical ones, that leaves twisted from the parallel to the perpendicular position showed an immediate rise in temperature of 4.2° to 6.3°, and that vertical leaves in meridional position showed a marked cooling in the middle of the day, followed by an equally marked increase in temperature as the sun moved into the west in the afternoon. On estimating the transpiration by loss in total weight of small potted plants, he found that transpiration was greater during the afternoon hours. He concludes that the plant is a typical sun-loving species, adapted to utilize the direct rays of the sun, while plants with horizontal leaves are adapted primarily to diffuse light. Various species of *Opuntia* in a glasshouse with light only from the south tended to develop their new growth also in a meridional position. Author states that in low latitudes with consequently high altitude of the sun any vertical position is sufficient to secure direct illumination during the major portion of the day, while in higher

latitudes with lower altitude of the sun a meridional position is necessary. He calls attention to the fact that plants with vertical leaves are relatively common in tropical and subtropical climates, while true compass plants are to be expected only in more northern latitudes.—*H. A. Gleason.*

225. Newman, L. F., and R. W. Newman. **Some records of the seasonal flora of arable land under cultivation.** Jour. Ecol. 6: 178–188. Nov., 1918.—Records throughout the entire summer upon variously tilled fields showed that although the flora was limited to a comparatively small number of species it showed decided and interesting fluctuations. Certain species would suddenly appear in large numbers on a particular field for reasons that could not be explained while there were also equally sudden and inexplicable disappearances. The causes of these phenomena are recognized to be of both economic and ecological importance. The complete disappearance of dead plants is also mentioned as one of the surprises of the investigation and while worms and fungi are among the probable agents, more extensive investigations in the near future are promised.—*Geo. D. Fuller.*

226. Sampson, Arthur W. **Climate and plant growth in certain vegetative associations.** U. S. Dept. Agric. Bull. 700. *72 p., 37 fig.* Oct., 1918.—A study of the growth and transpiration of *Pisum arvense, Triticum durum*, and *Bromus marginatus*, on the Wasatch Mts. in central Utah. Three stations were located in the Oak-brush (7,100 ft. alt.), the Aspen-fir (8,700 ft. alt.), and the Spruce-fir (10,000 ft. alt.) associations, open spaces being chosen for experimental purposes. In addition to the potometer transpiration measurements, wind velocity, air temperature, precipitation, evaporation, and barometric pressure were also measured and compared with plant growth and the water requirement. Temperatures and temperature summations were greatest in the Oak-brush type and decreased with altitude. Evaporation from the porous cup was most rapid in the Oak-brush and Spruce-fir, the former being due to high temperature and the latter to higher wind velocity. The water requirement was greater in each case in the Oak-brush type, as was also the temperature and evaporation and the sunlight measured by differential evaporation. While the total dry matter produced and the average leaf length were greatest in the Aspen-fir, the period of growth from seed time to flowering was shortest in the oak-brush and increased with altitude. Temperature summation for this period were nearly the same for each of the stations.—*H. L. Shantz.*

227. Sampson, Arthur W. **Effect of grazing upon aspen reproduction.** U. S. Agric. Bull. 741. *29 p., 5 pl., 7 fig.* Feb., 1919.—These studies were made at Manti National Forest in Utah and cover a period of five years. On lands bearing a stand of aspen (*Populus aurea* Tidest) it is advisable to maintain a proper balance between grazing and timber reproduction, both because of the value of the timber and the water-shed protection afforded. Aspen is often reproduced with difficulty where the lands were made to serve the double purpose of timber and meat production.

The leafage, young twigs, and branches are browsed by both cattle and sheep. Over 90 per cent of the damage inflicted by stock is chargeable to browsing. Sheep are responsible for severe damage, but the extent of injury by cattle is usually slight except where the lands are overgrazed. Injury by sheep amounted to the death of over one-half of the new growth in heavily grazed areas, and about one-third in lightly and medium grazed areas.

On clean-cut lands, the annual mortality due to sheep grazing is exceedingly heavy. Three years grazing results in the destruction of the entire stand. On lands protected from grazing aspen sprouts are produced during the first two seasons after cutting. On grazed lands a considerable number of sprouts are sent up for three successive seasons.

A surprisingly large proportion of the new growth, even on the most favorable sites is killed during the first three years. Frost, and bark-eating mammals notably gophers, field mice, and rabbits, are mainly responsible for such mortality. Sprouts averaging 45 inches in height are found to be exempt from destructive browsing by sheep. In the case of cattle there is some damage to sprouts between 55 and 60 inches in height, but seldom to those of any greater height. The annual rate of height increment of the aspen production averages about 15 inches. Hence sprouts three years of age are exempt from serious injury by sheep and those from four to five years of age are free from serious injury by cattle. Aspen is seldom able to reproduce under its own shade. [See Bot. Absts. 2, Entry 19.]—*H. L. Shantz.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

228. Lin, D. Y. **Deforestation and floods in northern China.** Jour. Forestry 16: 888–896. Dec., 1918.—Excerpts are given from engineers that the Chinese floods could be mitigated by the establishment of forests at the headquarters of the river systems with engineering works as aids. Five big waterways of China have a drainage area of 75,000 square miles, 60,000 of which are mountainous, discharging finally in one river which in 1917 rendered 5,611,759 people homeless, 17,646 villages more or less inundated, and flooded an area of 15,000 square miles. The effect of forests on stream flow, erosion and flood is discussed in general terms.—*E. N. Munns.*

229. Pickering, Spencer U. **Effect of one plant on another.** Ann. Bot. 31: 181–187. April, 1917.—Experiments were conducted to secure definite data on the production of toxin by growing plants. The experiment consisted of three flower pots with growing mustard plants and a perforated tray arranged to fit over them containing five inches of earth and with an aperture in the center for the plants to protrude through. All the water the plants needed percolated through these trays except in No. 2. Tray No. 3 contained earth without any plants. The perforations in the bottom of Tray No. 2 were blocked so that no water could reach the growing plants. Tray No. 1 also contained a crop of growing mustard plants and the perforations in the bottom were left open so that the washings could pass through them to the plants in the flower pot beneath. In the case of the growth of mustard in flower pots Nos. 2 and 3 there was practically no difference but in No. 1 where the washings from the mustard above had free access the growth was reduced to one-hundredth of their normal size. The conclusion would seem obvious that the leachings from the plants growing in the trays must contain something which is toxic to other plant growth. The author states that by means of pot experiments the following plants have been found susceptible to such influence: apples, pears, plums, cherries, six kinds of forest trees, mustard, tobacco, tomatoes, barley, clover, and two varieties of grasses; whilst the plants exercising this baneful influence have been apple seedlings, mustard, tobacco, tomatoes, two varieties of clover and sixteen varieties of grasses. In no case have negative results been obtained. The extent of the effect varies very greatly; in pot experiments the maximum reduction in growth of the plants affected has been 97 per cent, the minimum 6 per cent, whilst in field experiments with trees, the effect may vary from a small quantity up to that sufficient to cause the death of the tree. The average effect in pot experiments may be roughly placed at a reduction of one-half to two-thirds of the normal growth of the plant, but no sufficient evidence has yet been obtained to justify the conclusion that any particular kinds of plants are more susceptible than others, or that any particular surface crop is more toxic than another; that such differences exist is highly probable but all the variations observed so far may be explained by the greater or lesser vigor of the plants in the particular experiments in question. Similarly, as regards the effect of grass on fruit trees, though the extent of it varies very greatly, and in many soils is certainly small, we must hesitate to attribute this to any specific properties of the soils in question; for when soils from different localities (including those from places where the grass-effect is small) have been examined in pot experiments, they have all given very similar results; and this applies equally to cases where pure sand, with the addition of artificial nutrients, has been taken as the medium of growth.

It is stated that the various possibilities which suggested themselves in explanation of this effect, were excluded one by one until the only possibility left is the formation of some toxic substance. The following are some of the factors which were eliminated:—protection and moisture; alterations in temperature; alkalinity or physical condition of the soil; alterations in its carbon dioxide; and bacterial contents.—The remainder of the article is devoted to showing how these factors among others will eliminate the suggested possibilities. The method of demonstrating how the effect produced is not explained by insufficient food supply is shown as follows:

When a stronger and weaker plant, or an older and younger one, are growing side by side, we find that the latter rarely picks up, and generally gets more and more behind its stronger brother. This cannot be due to the stronger one monopolizing the food supply; for if it exhausted this supply, both plants would suffer at the same time, and, till that supply is exhausted, both would flourish equally. The inadequacy of any such explanation is demonstrated by taking a pot of soil capable of growing, say, six plants, sowing the seed for three of them first, and that for the other three a certain number of days later. In the case of mustard, when the difference of date is only four days, it is found that, at the end of growth, some two or three months later, the last sown plants are 60 to 70 per cent smaller than the others. It is evident that three four-day-old seedlings could not have exhausted the nourishment in 7.5 kilos of rich soil so far as to leave insufficient food for three other seedlings; nor can a difference in age of four days in a total life of several months account for such a difference in the weights of the plants. But the results become clear if we take into account the toxic effect of one plant on the other, for the later planted individuals have to start growth under toxic conditions which were absent in the case of those first planted, and throughout their existence their inferiority in size will make them suffer more than their stronger brethren, though the actual amount of toxin in the soil is the same for all.—In working on the factor of root influence it is stated that when a number of plants are grown together in one pot or in one plot in the field, and when the crowding attains to a certain magnitude, the limiting factor is the amount of soil available for each plant, the result of which is that the weights of the plants are inversely proportional to the bulk of the soil available (the soil area) or in other words the total plant growth is the same whatever be the number of plants.—*E. R. Hodson.*

230. Secrest, Edmund. **War time uses of timber.** Monthly Bull. Ohio Agric. Exp. Sta. 3: 321–327. Nov., 1918. [Whole no. 35.]—Black walnut for gunstocks and airplanes was in great demand and coöperative methods of handling the sales to make car-load shipments are described. Small trees and shade trees were not needed. White ash for airplanes and handles was greatly needed and the care necessary in getting this material without waste is shown. Oaks were used for artillery, motor truck, and ship-building purposes, and the locust for treenails. Care of young growth and the plantation of additional trees are urged. —*E. R. Hodson.*

231. Secrest, Edmund. **Meeting the wood fuel situation.** Monthly Bull. Ohio Agric. Exp. Sta., 3: 291–299. Oct. 10, 1918. [Whole no. 34.]—Information is given on the value of local species for fuel, and the weights of the woods and their equivalents in coal. Information as to machinery, costs, and methods of preparing wood fuel is presented in a popular manner.—*E. R. Hodson.*

GENETICS

George H. Shull, *Editor*

232. Anonymous. **Wanted, photographs of twins.** Jour. Heredity 9: 262. Oct., 1918.—American Genetic Association of Washington, D. C., asks that photographs of twins be sent to its address. Pictures at different ages are especially desired in order to determine degree of resemblance and its persistence through life. Any additional information such as address of known twins who might be willing to coöperate with the Association, is called for. Special interest is shown in difference between identical and fraternal twins.—*H. H. Laughlin.*

233. Babcock, E. B., and R. E. Clausen. **Genetics in relation to agriculture.** *15 × 23 cm., x x + 675 p., 239 fig., 4 colored pl.* McGraw-Hill Book Co.: New York, 1918.—Review by Spillman, W. J. Jour. Heredity 9: 361. Dec., 1918. [See also Bot. Absts. 1, Entries 210, 220, 244.]

234. Barker, E. Eugene, and R. H. Cohen. **Variability in the radish.** Jour. Heredity 9: 357–361, 384. *Fig. 10.* Dec., 1918.

235. Boveri, Theodor. **Zwei Fehlerquellen bei Merogonieversuchen und die Entwicklungsfähigkeit merogonischer und partiellmerogonischer Seeigelbastarde. [Two sources of error in investigations of merogony and the ability of merogonic and partially merogonic sea-urchen hybrids to develop.]** Arch. Entwicklungsmech. d. Organ. 44: 417–471. *3 pl.* 1918.

236. Bridges, C. B. **Duplication.** Anat. Rec. 15: 357–358. Jan. 20, 1919.—Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918: "In *Drosophila melanogaster* several cases of abnormal inheritance are accounted for by the assumption that in each case a piece of chromosome has been taken from its normal position and joined to another chromosome.—In the first of these cases a section of the X-chromosome, including the loci for vermilion and sable, became detached from its normal location in the middle of the X-chromosome and became joined onto the 'zero' end (spindle fiber) of its mate. For certain loci this latter chromosome carries two sets of genes—those present in the normal location and also the duplicating set. If a male carries the recessive genes for vermilion and for sable in the normal loci and the wild type allelomorphs in the duplicating loci, he is wild-type in appearance precisely as though he were an XX female heterozygous for vermilion and sable. A female having one such chromosome and a normal chromosome carrying the vermilion and sable genes is triploid for these loci. It has thus been proved that [two] recessive genes may dominate one dominant. A female tetraploid for these loci can be made, and by this means it was shown that two recessives are recessive to two dominants. Criss-cross inheritance of the Abraxas type can be initiated in Drosophila by crossing one of the above wild-type females to a vermilion sable [male], for the daughters are vermilion sable and the sons wild-type.—In another case of duplication the duplication piece contains only the locus for sable as far as known. In both of these cases the duplicating piece is joined on at the zero end (spindle-fiber), and experiments can be made in which the linkage of vermilion and sable will indicate a locus at zero instead of at 33 and 43, respectively.—A third case is the transposition of a piece of the second chromosome to the middle (spindle fiber) of the third chromosome. The genes of this duplication piece show linkage to both the second and the third chromosome at the same time. In this third case both the duplicating fragments attached to the III chromosome and the II chromosome that suffered deficiency are on hand. Any gamete that receives this deficient II chromosome dies unless at the same time it receives the third chromosome carrying the missing piece.—The most significant bearing of these cases is upon the idea of evolution of chromosome groups."—*Geo. H. Shull.*

237. Detlefsen, J. A. **Fluctuations of sampling in a Mendelian population.** Genetics 3: 599–607. Nov., 1918.—Author obtained large number of mice from backcross involving three pairs of Mendelian factors. Ratios in population as a whole were found to agree well with Mendelian expectation, as brought out in another paper. In present paper, it is shown that the distribution of colors within the litters is also in close accord with laws of chance. Pearson's test for goodness of fit is used throughout.—*Sewall Wright.*

238. Detlefsen, J. A., and E. Roberts. **On a back cross in mice involving three allelomorphic pairs of characters.** Genetics 3: 573–598. Nov., 1918.—Authors tested mathematically the conformity of results with Mendelian expectations in a trihybrid cross. Wild gray and pink-eyed brown mice, which are believed to differ in respect to three factors, were mated, and resulting hybrids were back-crossed to triple recessive form (pink-eyed brown). In statistical treatment, each monohybrid ratio was first dealt with separately; then each dihybrid combination; finally the trihybrid combinations. These determinations were based upon some 4500 individuals.

Monohybrid ratios were in every case reasonably close to expectation, with no evidence of selective mortality prior to birth. After birth, however, there was selective elimination of non-agouti individuals as compared with agouti.

With one possible exception, recombinations among the three pairs of allelomorphs was purely haphazard, there being no linkage. This exception was a slight apparent tendency toward "repulsion" (i.e., excess of recombinations over parental combinations), when the factors agouti and dark-eye and their allelomorphs are considered. This "suggests slightly different frequencies in the various kinds of maturation divisions."—*F. B. Sumner.*

239. Downey, June E. **Standardized tests and mental inheritance.** Jour. Heredity 9: 311–314. *Fig. 7.* Nov., 1918.—Statement of problem of determining special aptitude in children at early age. Goddard's work in utilizing Binet scale in intelligence as basis of Mendelian studies is mentioned. Need for additional tests for super-normal children is set forth. Five children are described giving results of specific tests for each case.—*H. H. Laughlin.*

240. Gates, William H. **Another hen that crowed.** Jour. Heredity 9: 343–347. *6 fig.* Dec., 1918.—See Bot. Absts. 2, Entry 670.

241. Glaser, O. C. **Inheritance of absence of the sense of smell.** Jour. Heredity 9: 347. Dec., 1918.

242. Goodale, H. D. **Winter cycle of egg production in the Rhode Island Red breed of the domestic fowl.** Jour. Agric. Res. 12: 547–574. 1918.—A study of individual egg-records of Rhode Island Red hens associated with a study of length and seasonal distribution of pauses in production, conducted to classify individual hens with reference to their winter cycle. Author reports (1) examination of data published by Gowell confirms statements of Pearl and Surface regarding presence of winter cycle in Barred Plymouth Rock hens; (2) winter cycle is much more characteristic of the Maine flocks than of author's Rhode Island Reds, in which the cycle can be demonstrated in portion of flock only; (3) period of decreased flock-production for Barred Plymouth Rocks and White Wyandottes comes in February, while for Rhode Island Reds it may come in January or February; (4) A pause, or series of pauses, usually exceeding 10 days in length and following a considerable period of egg-production, is best index of existence of winter cycle in the individual Rhode Island Red hen; (5) rate of production does not furnish satisfactory index of presence or absence of winter cycle; (6) evidence is presented which indicates winter cycle may be inherited in some definite but unascertained manner. [Abst. in Exp. Sta. Rec. 38: 876. Aug. 9, 1918.]—*Philip Hadley.*

243. Goodspeed, T. H., and R. E. Clausen. **An apparatus for flower measurement.** Univ. California Publ. Bot. 5: 435–437. *Pl. 54, fig. 1.* 1918.—Authors give constructional diagrams and methods of use of instrument to expedite linear measurements in biometrical work, especially with flowers.—*J. P. Kelly.*

244. Heal, John. **Hybridization and cross-fertilization of flowers.** Gard. Chron. 65: 25–26. *Fig. 9.* Jan. 18, 1919.—See Bot. Absts. 2, Entry 675.

245. Hegner, R. W. **Variation and heredity during the vegetative reproduction of Arcella dentata.** Proc. National Acad. Sci. U. S. Amer. 4: 283–288. Sept. 1918.

246. Hegner, R. W. **Quantitative relations between chromatin and cytoplasm in the genus Arcella, with their relations to external characters.** Proc. National Acad. Sci. U. S. Amer. 5: 19–22. Jan., 1919.—Studies of nucleo-cytoplasmic and of chromatin-cytoplasmic relations in two species of *Arcella.* Nucleus is of type with chromatin in spherical mass at center. *Arcella dentata* has two nuclei per cell; an individual cut in two gave origin to uni-nucleated progeny that averaged smaller than normal; bi-nucleated condition was later resumed and with it diameter which was characteristic before experimentation. In *A. polypora* cells of clone 5 had 3 to 7 nuclei; showed marked correlation between diameter of cell and number of nuclei; cells of clone 34 had 5 to 10 nuclei with cell diameter less than those of cells with less number of nuclei in clone 5; quantity of chromatin, however, in specimens of same size in two clones was same regardless of nuclear number. In *A. dentata* diameter of

shell and spine number are correlated with chromatin mass. Author suggests that results of selection in *Difflugia* and *Centropyxis* may have been due to change in quantity of chromatin rather than in quality.—*J. P. Kelly.*

247. Ireland, Alleyne. **Democracy and the accepted facts of heredity. A biological view of the Government.** Jour. Heredity 9: 339–342. Dec., 1918.

248. Kiessling, L. **Einige besondere Fälle von chlorophylldefekten Gersten. [Several special cases of barley defective in chlorophyll.]** Zeitschr. indukt. Abstamm. Vererb. 19: 160–176. June, 1918.

249. Lathrop, A. E. C., and L. Loeb. **Further investigations on the origin of tumours in mice. V. The tumour rate in hybrid strains.** Jour. Exp. Med. 28: 475–500. 1918.—"In selecting for hybridization various groups of mice representing a low tumour strain and other groups representing a high tumour strain, there were obtained in the majority of cases hybrid strains with a tumour rate intermediate between that of the parent strains. There does not appear to be a fixed rule as to dominance in the tumour rate. The results of this investigation confirm the authors' previous conclusion that, in the majority of crosses which are observed, the cancer rate is either intermediate between those of the father and mother strain, or that it follows the tumour rate of the parent with the higher rate, and only in a relatively small number of instances the cancer rate follows that of the parent strain with the lower tumour rate." [Abstract from Physiol. Absts. 3: 538. Jan., 1919.]—*J. C. D[rummond].*

250. Lippincott, W. A. **Pedigreeing poultry.** Kansas Agric. Exp. Sta. Circ. 67: *16 p., 10 fig.* 1918.

251. Lotsy, J. P. **Proeven en beschouwingen over evolutie. [Experiments and speculations concerning evolution.]** Genetica 1: 3–7. Jan., 1919.

252. Lotsy, J. P., H. N. Kooiman, and M. A. J. Goedewaagen. **Proeven en beschouwingen over evolutie. I. De Oenotheren als kernchimeren. [Experiments and speculations concerning evolution. The Oenotheras as nuclear chimeras.]** Genetica 1: 7–69. Jan., 1919.

253. Lotsy, J. P. **Over de mogelijkheid van intranucleaire kruising bij homozygoten. [On the possibility of intranuclear crossing in homozygotes.]** Genetica 1: 92–97. Jan., 1919.

254. Lumsden, D. **Orchid breeding.** Jour. International Gard. Club 2: 203–212. *5 fig.* 1918.

255. McEwen, R. S. **The reactions to light and to gravity in Drosophila and its mutants.** Jour. Exp. Zool. 25: 49–106. *3 fig.* 1918.—A mutant stock of *Drosophila melanogaster* called tan is characterized by loss of positive heliotropism shown by wild flies. This character is recessive and sex-linked; tan mother by wild male gives daughters that are positively heliotropic and sons that are indifferent. When wings of wild fly are cut off at base, fly loses its positive reaction. Mutant races with short wings are less strongly positive. Mutant races with different eye colors react differently to light of different colors.—*T. H. Morgan.*

256. Middleton, Austin Ralph. **Heritable effects of temperature differences on the fission rate of Stylonychia pustulata.** Genetics 3: 534–572. *5 fig.* Nov., 1918.—Problem is "how living systems may become modified so that the modifications remain in later generations, even after the modifying factors are removed." Infusorian, *Stylonychia pustulata,* multiplying by fission, was subjected to diversities of temperature for various periods. Three series of experiments were carried out. (1) Sixty lines belonging to one clone were kept at 30°–32°C. and sixty at 18°–20°C. Diversities in fission rate occurred; that of specimens kept at higher temperature was 33.47 per cent greater for a 20-day period. Similar difference in fission rate persisted for 16 days after the two groups were brought into room temperature, but was lost 31 days later. (2) Lines derived from single specimen were kept at 28°–30°C.

and 6°-9°C. respectively, and samples tested at high, intermediate, and low temperatures at intervals of 20, 40, 60, 120, and 170 days. At 20 days, high line divided more rapidly; at 40 days or more, high line divided more slowly; and at end of 6 months, high line died out but low line was as viable as at first. (3) Samples of lines kept at diverse temperatures for 30 days showed at high temperature a higher fission rate for the high line; at intermediate temperature higher fission rate for low line; and at low temperature, first higher fission rate for low, but later for high line.—*R. W. Hegner.*

257. Muller, H. J. **Genetic variability, twin hybrids and constant hybrids, in a case of balanced lethal factors.** Genetics 3: 422–499. *1 fig.* Sept., 1918.—Analysis of beaded wing race of *Drosophila melanogaster*. By means of ingenious and precise methods, author has obtained solution of this case, which had been the most difficult one in Drosophila. Beaded gene lies in third chromosome; and is dominant in its effect on wings but has recessive lethal effect as in yellow mouse case. Unlike latter case beaded stock bred true in its later history. Author shows that this is due to existence of a lethal mutation in the not-beaded third chromosome of the stock. Stock is thus permanently heterozygous, since the homozygous beadeds and the homozygous lethals all die. Case is also complicated by presence of gene that decreases crossing over in this region, thus making heterozygous condition more stable. Permanently heterozygous condition, due to such "balanced lethals," makes possible many curious results. Author has obtained twin hybrids of same type as those occurring in Oenothera. He shows that known recessive mutants may be introduced into such stocks, and may remain concealed even while the stock is bred without selection. Occasional crossovers will cause these recessives to appear in small numbers, thus simulating recurrent mutations. "Mutations" of this type may be prearranged to appear with almost any desired frequency. Judging by frequency of occurrence of lethal mutations in *Drosophila*, it seems likely that balanced lethal condition may arise not infrequently. Conclusion is drawn that unusual genetic behavior of *Oenothera*, including large proportion of its "mutations," is due to a complicated case of balanced lethals.—*A. H. Sturtevant.*

258. Nieuwland, J. A. **Teratological notes.** Amer. Midland Nat. 5: 231. 1918.—Abnormal form of *Onoclea sensibilis* has been found, in which a vegetative frond had changed to sporophyll. Albino plants of *Lobelia syphilitica* and white-flowered specimens of common harebell were collected along shores of Lake Michigan in northern Indiana.—*J. H. Kempton.*

259. Popenoe, Paul. **Will morality disappear?** Jour. Heredity 9: 269–270. Oct., 1918.—Frederick Adams Woods is quoted as authority for statement that morality of members of European royal families, who are parents, is definitely correlated with number of their children who reach age of twenty-one years. Lowest grade of morality had 1.66 children each, the highest had 3.83. Royalty is suggested as good working material because of artificial incentive for all members of royal families to have many children.—J. McKeen Cattell is quoted to effect that the two-children family is practically standard among American men of science. A. H. Estabrook's Juke studies show that there were 4.3 children to each fertile degenerate woman. In solution of the problem it is suggested that the sociologist and economist rather than eugenicist should take up the task.—*H. H. Laughlin.*

260. Popenoe, Paul, and Roswell H. Johnson. **Applied eugenics.** *14 × 20 cm., v + 459 p., 46 fig.* The Macmillan Co.: New York, Oct., 1918.

261. Schiemann, E. Review of: A. Haenicke. **Vererbungsphysiologische Untersuchungen an Arten von Penicillium und Aspergillus. (Genetical investigations on species of Penicillium and Aspergillus.)** Zeitschr. Bot. 8: 225–343. *1 pl., 11 fig.* 1916. Zeitschr. indukt. Abstamm. Vererb. 19: 310–311. Aug., 1918.—Author found all degrees of constancy or inconstancy of variations in *Aspergillus* and urges a revision of the concept "mutation." Reviewer holds that mutation among higher organisms with sexual reproduction has become entirely definite concept, but that Bacteria hold a unique place because, due to lack of sexuality, inheritance and non-inheritance can not be distinguished. Bacteria should be grouped

therefore with those higher organisms in which sexual reproduction is wanting, not forgetting that persistent modifications may be paralleled with hereditarily constant characters which occur in nearest-related forms with sexual reproduction (*Paramecium*, *Phycomyces*). Each investigator must follow his own taste in such cases, as to which analogy he prefers.—*Geo. H. Shull.*

262. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: A study of bud variation in the Washington navel orange.** U. S. Dept. Agric. Bull. 623. *146 p., 19 pl., 16 fig.* 1918.—See Bot. Absts. 2, Entry 707.

263. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: A study of bud variation in the Valencia orange.** U. S. Dept. Agric. Bull. 624. *120 p., 14 pl., 9 fig.* 1918.—See Bot. Absts. 2, Entry 708.

264. Shamel, A. D. **Bud variation in dahlias.** Jour. Heredity 9: 362–364. *Fig. 11–12.* Dec., 1918.—See Bot. Absts. 2, Entry 706.

265. Shull, A. Franklin. **Symposium on the trends in zoology. 2. The trend of genetics.** Rept. Michigan Acad. Sci. 20: 105–108. 1918.—Author sees no increased tendency of genetics toward utilitarian ends as result of war conditions, and thinks this is to be regretted. Mere demonstration that characters Mendelize is no longer sufficient. Fundamental progress can be made now only in relating facts of genetics to other facts of biology. Central theoretic aim of genetics is discovery of method of evolution by study of origin of changes and their preservation. Discoveries of Morgan and his workers should loom large in genetics for many years to come. Concerning genes, future should reveal what they are, whether enzymatic for example; how they produce their somatic effect; whether relatively stable or readily alterable.—*J. P. Kelly.*

266. Shull, A. F. **Environment and inherited characters in Hydatina senta.** Biol. Bull. 35: 335–350. 1918.

267. Stockard, Charles R. **Hereditary deficiencies in the sense of smell.** Science 49: 237–239. Mar. 7, 1919.

268. T. W. **Hybridization and cross-fertilization of flowers.** Gard. Chron. 65: 46. Jan. 25, 1919.

269. Voorhoeve, N. **Hereditary abnormalities.** Lancet 1918 (ii): 740–741. 1918.—"A genealogical chart is presented of a family showing abnormalities through four generations. The survivors, a father and his two daughters, all have brittle bones and blue sclerotics; haemophila also figures in the family tree, and was present in the father but not in the daughters. The disorders are put down to hereditary inferiority of mesenchyme." [Abst. from Physiol. Abst. 3: 499. Jan., 1919.]—*W. D. H[alliburton].*

270. Woods, Frederick Adams. **Will not morality necessarily improve?** Jour. Heredity 9: 331–332. Nov., 1918.—Answer to Popenoe's article, "Will morality disappear?" [See Bot. Absts. 2, Entry 259]. Author grants that birth rate among America's biologically best has been recently declining rapidly, but hopes that parental instinct will save morality, holding that there is correlation between the two. Short criticism of methods in evaluating social leaders is given.—*H. H. Laughlin.*

271. Woods, Frederick Adams. **Kaiserism and heredity.** Jour. Heredity 9: 348–353. *1 chart.* Dec., 1918.

272. Zeller, J. H. **A simple hog-breeding crate.** U. S. Dept. Agric. Farmers' Bull. 966. *4 p., 1 fig.* 1918.—Directions for making and operating a hog-breeding crate. Increases the number of successful matings.—*H. K. Hayes.*

HORTICULTURE

W. H. CHANDLER, *Editor*

273. COIT, J. E., AND R. W. HODGSON. **The June drop of Washington navel oranges**—Bulletin No. 290, California Agric. Exp. Sta. Bull. 290: 203–212. Jan., 1918.—June drop of Washington navel oranges causes an annual loss of $1,225,000 to $1,750,000 in California and is the limiting factor in profitable navel-orange production in many parts of the interior valleys of California and Arizona. The drop itself can be separated into two parts, that occurring from petal fall until the fruit is about an inch in diameter, and that occurring after that time. The first part is much the more serious and is due to abnormal water relations which serve as a stimulus to abscission. The second part is less important and is due to the fungus *Alternaria citri* of wide distribution which is also the cause of black rot of navel oranges. The fruits showing the black rot represent those infected fruits which managed to survive to maturity, other infected fruits having fallen, chiefly during the months of July and August.—The water-relations drop bears a definite relation to climatic conditions and all efforts looking toward prevention or control must be either in the nature of modifying environmental conditions, or in selection for dry-heat strains. Of these two the former seems to promise the more immediate results.—*E. O. Essig.*

274. COIT, J. ELIOT. **The etrog or cedrat of the Hebrews.** California Citrograph 6: 3. 3 *fig.* Nov., 1918.—The only reference to a citrus fruit in the Bible is in Leviticus 23:40, the word "hadar," translated "goodly trees," referring to the citron which the Hebrews use in their ceremonials at the Feast of the Tabernacles. Since the beginning of the war the supply from Trieste and Greece has been entirely cut off and Jewish rabbis are searching California for specimens. The possibilities of etrog culture in California are considered, the profits being regarded as problematical, although the fruit could be made into candied citron if the demand for etrog fell off.—*I. J. Condit.*

275. HALLIGAN, C. P. **Horticultural notes.** Michigan Agric. Coll. Quart. Bull. 1: 31. Aug., 1918. The author notes the value of acid phosphate in stimulating growth and vigor of young apple trees.—*R. D. Anthony.*

276. HAWLEY, I. **The blooming period in olives and its lessons for the grower.** Fig and Olive Jour. 2: 9–11. *1 fig.* April, 1918.—Divides the annual life of the olive into three periods; the first, March 15 to June, constituting the blooming period; the second June 1 to December 15, comprising the period when the fruit is matured and new growth produced; and the third, completing the cycle to March 15, constituting the rest period. Emphasizes the importance of careful observation during the blooming period as at this time more can be learned regarding the general health and thrift of the trees than at any other time. Takes a fruiting branch and traces the stages in the development of flower buds into flowers and on until the fruit is past the critical period, illustrating each stage with a photograph. Discusses the balance existing between energies of the tree going into development of fruit and into production of new wood. Lays alternate habit of bearing to lack of proper balance between the two. Trees bearing too much fruit do not have sufficient strength to develop fruit wood for next season's crop. Finds 162 flower buds on the twig pictured which on basis of 2500 fruit bearing twigs to a twenty-year old tree would give 290,000 flowers. Of these flowers nearly 90 per cent are imperfect, possessing only rudimentary pistils. These are commonly called "male" flowers. Only the perfect or "female" flowers set fruit. Of the 162 flowers on the twig in question 8 flowers or 7 per cent set and brought fruit to maturity. Twice this many were set but half subsequently dropped off. Figuring 125 olives to the pound and the maturity of seven per cent of 290,000 flowers, a yield of four tons of fruit to the acre would be obtained. Practical growers know this to be undesirable as, even if possible, the fruit would be undersized. Concludes that a set of 3.5 per cent approaches a normal condition, allowing the tree to develop fruit wood for the next season, and still mature a crop of large-sized fruit. —*R. W. Hodgson.*

277. Hawley, I. **The pollination and fertilization of the olive blossom.** Fig. and Olive Jour. 2: 1-2. May, 1918.—Distinguishes between pollination and fertilization, the former constituting the mechanical processes concerned in carrying the pollen grain to the stigma, the latter consisting of the fusion of the two sex cells. The olive is wind pollinated as evidenced by the enormous amount of pollen produced as well as by the absence of nectar and odor and no provision made for insect pollination through morphological adaptations in the flower. Concludes that instead of being beneficial bees are actually detrimental in that the absence of nectar forces them to feed on the pollen itself. Thrips are said to be an aid in effecting pollination. Inadequate pollination is held responsible for smaller quantity of fruit produced in tops of trees. Mentions rains, frost, excessive heat, and strong winds as climatic conditions hindering or preventing pollination. Considers possibility of increasing yields by cross fertilization, stating that there is evidence supporting this idea. Mission and Manzanillo varieties said to be self fertile. Suggests experimental work to prove the point. Places burden for such work upon the Agricultural Experiment Station. Considers the problems concerned with the setting of the fruit of prime importance in such investigational work, giving ideas current among growers regarding causes of shedding of immature fruits.—*R. W. Hodgson.*

278. Shamel, A. D. **Furrow manure method of feeding orange trees.** California Citrograph 4: 5. *3 fig.* Nov., 1918.—The writer answers a number of inquiries regarding the furrow method of distributing manure in citrus orchards. Application during the late summer and fall months is advised, the furrows in general being made from 6 to 8 inches deep.—*I. J. Condit.*

279. Shamel, A. D. **Can California produce good grapefruit?** California Citrograph 3: 153. May, 1918.—The writer when first coming to California became prejudiced against California grapefruit by eating an unripe sample. Later experience with the ripe fruit reversed his first opinion and caused him to make a study of the grapefruit situation.—The conclusions from this study are summarized under four heads:—First. Much of the inferior grapefruit which has in the past been marketed by California comes from trees of inferior strains. These are the result of careless bud selection by the nurseryman. In a careful study of 500 trees in one of the best grapefruit groves of California, 25 per cent of the trees were found to be of inferior strain, bearing round fruits, containing many seeds, and of poor flavor and quality. The best strain of trees in this orchard bore flattened fruit, with thin rinds, abundance of juice of fine quality and flavor, and few or no seeds.—Second. Until five years ago a large part of the California grape-fruit crop was picked in the winter when the fruits were unripe and sour. Since then by allowing the fruit to ripen on the tree and marketing it in the summer, after the Florida crop has been disposed of and before the Porto Rico crop reaches the market, better results have been obtained. Third. All locations are not equally suitable for producing good grapefruit. Best results are obtained on sandy soils and at higher elevations.—Fourth. It is practicable to eliminate much of the poor quality grapefruit in the packing house. Packing house managers should be trained to segregate and pack the fruit of best quality.—The practical way to improve established orchards of Marsh grapefruit is to eliminate trees bearing seeded or poor grade fruit. The way to improve the Marsh variety is to propagate only the best strains. In a seven year study where 9 fruits per tree were cut each year, 19 trees of best strain averaged 2.6 seeds per fruit, while four trees of the rough, seeded strain averaged 52.2 seeds per fruit.—*C. S. Milliken.*

280. Shamel, A. D. **Better California grapefruit.**—California Citrograph 3: 94. March, 1918.—During the year 1917 progress was made in many California grapefruit orchards in replacing the poor strains of Marsh Seedless trees by rebudding with the best strains. Budwood from the best strains was made commercially available by the California Fruit Growers Exchange.—The culture of the improved strain of Marsh grapefruit in California has proved profitable. The favorable change in market conditions toward California grapefruit may be attributed to: (1) Shipment of fruit from May to October, when it is ripe, instead of the ship-

ment of immature fruits from December to May. (2) The steady elimination from the orchards of trees producing coarse, thick-skinned, seeded fruits, leaving the trees producing smooth, thin-skinned, commercially seedless fruits. (3) More careful grading and packing. —That the best strain of Marsh grapefruit can be successfully propagated by careful bud selection was clearly shown in a survey made by the author of the groves where attention to this bud selection was practiced either in setting out young trees or in working over old trees. Many of the poor trees now occurring in California orchards have been definitely traced to carelessness in bud selection by nurserymen.—*C. S. Milliken.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. Sinnott, *Editor*

THALLOPHYTES

281. Adams, J. F. **Origin and development of the lamellae in Schizophyllum commune.** Mem. Torrey Bot. Club 17: 326–333. *Pl. 1, 2 fig.* 1918.—In *Schizophyllum* the lamellae originate by formation of endogenous gill cavities in a manner similar in principle to that which Levine finds in *Cropinus micaceus.* The gill cavities are lined from the first by a palisade layer and represent the space between the adjacent halves of two lamellae. Gill cavities split along the lower edge and lamellae are thus formed from the adjacent walls of two gill cavities. The tissue below the gill cavity becomes looser in texture, thus favoring the splitting. The pileus enlarges by growth of primary lamellae and development of additional lamellae formed from gill cavities. It is evident from this method of the origin of the gill cavities as independent tubes, that gills in their essential nature are hymenium-bearing plates between independently originating endogenous gill cavities.—*R. H. Denniston.*

282. Dodge, B. O., and J. F. Adams. **Some observations on the development of Peridermium cerebrum.** Mem. Torrey Bot. Club 17: 253–261. *Pl. 4–6, 3 fig.* 1918.—Authors made a study of this fungus on *Pinus rigida* in the vicinity of Lakehurst and Toms River, New Jersey. Canker-like swellings were found to be either elongated or circular and were found on trunks up to 18 inches in diameter. At least half of the trunk is very often girdled. Very often effect on host is to produce a fusiform enlargement of the stem while in other cases a bend or knee is formed. Mycelium is uninucleate and appears to follow the medullary rays. Haustoria are found especially in phloem and medullary rays. The bark is split by the developing gall and spermatia exude in yellowish droplets. Spermagonia are not definitely delimited units. It is not possible to determine accurately very long in advance those swellings which will produce aecidia. Gametophoric hyphae are eight or more cells in length. In the canker-like swellings of the New Jersey material no galls were found bearing both aecidiospore and spermatium galls. Mature uredosori were found on seedlings of *Quercus ilicifolia* and *Q. marilandica* which were located within two feet of the infected base of a pine tree. Infections were made on *Quercus ilicifolia, Q. marilandica,* and *Q. heterophylla.* [See Bot. Absts. 2, Entry 508.]—*E. T. Bartholomew.*

283. Kylin, H. **Studien über die Entwicklungsgeschichte der Phaeophyceen.** [**Studies on development of Phaeophyceae.**] Svensk Bot. Tidsskr. 12: 1–64. 1918.—A number of observations support the author's contention that the reduction divisions in the Phaeosporeae occur in connection with spore formation. Members of this group were grown in culture solutions containing sodium nitrate, and sodium nitrate with potassium phosphate. Fertile *Chorda* was found only in the latter, as were also germinating zoospores of *Stilophora rhizoides* and *Asperococcus bulbosus.* In the latter the author finds a few plurilocular sporangia on the gamete-bearing individuals. These individuals are a little smaller than the spore-bearing plants. In *Ectocarpus tomentosa* the gametes do not copulate but develop parthenogenetically, which condition is believed to be a derived one. In *E. siliculosus* the plurilocular sporangia may produce either gametes or asexual spores, "parthenogenetic gametes," which in turn produce gamete-bearing plants again. The zygote produces a sporophyte and reduc-

tion occurs in the division of the primary nucleus of the unilocular sporangium. Male and female gametophytes, microscopic in size and with their sex organs, are reported for *Chorda filum*. Only one sperm is produced in each antheridium and this has not yet been found free, nor has fusion been observed. Reduction division occurs as in *E. siliculosus*. *Chorda* should be included among the Laminariaceae. The paper concludes with an outline of the various types of alternation of generations in the Phaeosporeae.—*C. H. Farr.*

BRYOPHYTES

284. HAUPT, ARTHUR W. **A morphological study of Pallavicinia Lyellii.** Bot. Gaz. 66: 524–533. *Pl. 20–24.* 1918.—After a brief note on the relationships of the genus *Pallavicinia* the author describes the morphological features of the widely distributed *P. Lyellii*, devoting especial attention to the sexual organs and the sporophyte. He finds that the development of the antheridium is essentially the same as in the other genera of the anacrogynous Jungermanniales and notes the peculiar involucral structures which are found in connection with the elongated groups of antheridia. In the case of the archegonium he emphasizes the long neck, sometimes containing as many as eighteen neck canal cells, and shows how the characteristic tubular perianth develops after fertilization. In the sporophyte the lower segment found by the first wall in the fertilized egg undergoes very few divisions and forms a haustorial organ, similar to what has been described in *P. Zollingeri* and *Aneura pinguis*. The upper segment forms the bulk of the sporophyte, the differentiation of the sporogenous tissue occurring relatively late; in this respect *P. Lyellii* agrees with the closely related genus *Symphyogyna*. An inconspicuous cap is formed at the apex of the capsule and dehiscence takes place by means of four longitudinal slits, the valves remaining attached at the tip. The figures illustrate fully the various developmental processes described.—*Alexander W. Evans.*

PTERIDOPHYTES

285. BROWN, E. D. W. **Apogamy in Camptosorus rhizophyllus.** Bull. Torrey Bot. Club 46: 27–30. *Pl. 2.* 1919.—Prothallia of *C. rhizophyllus* were reared from spores in small glass capsules containing 26 cc. of Knop's full nutrient solution. Ten weeks after sowing, a single apogamous sporophyte appeared on one of the prothallia. Normal sporophytes followed later.—*J. H. Faull.*

286. DARNELL-SMITH, G. P. **The gametophyte of Psilotum.** Trans. Roy. Soc. Edinburgh 52': 79–91. *Pl. 1–2.* 1918.—Spores of *Psilotum*, sown in the laboratory between pieces of sandstone, and in the field, germinated and the earlier stages in the development of the gametophyte were followed. Mature gametophyte is described as a cylindrical, single or branched, saprophytic body, bisexual, subterranean, light brown in color, radially symmetrical and densely covered with long brown rhizoids. It is best found by carefully searching with a hand lens quantities of soil taken from rock fissures in the habitat of adult plants.—*J. H. Faull.*

287. LAWSON, A. A. **The gametophyte generation of the Psilotaceae.** Trans. Roy. Soc. Edinburgh 52^1: 93–113. *Pl. 1–5.* 1918.—Author gives a full account of the gametophytes of *Tmesipteris* and *Psilotum*. Both are hypogeous, ½ inch or more below surface of soil, and are remarkably alike. They are light brown, cylindrical, branched and devoid of chlorophyll. Their tissues are occupied by a mycorrhizal fungus. Antheridia and archegonia are always borne upon the same gametophyte and are not localized in their distribution. Male gametes are multiciliate. Archegonium projects slightly beyond surface and possesses a neck of 4 rows of cells and a single canal cell. In *Tmesipteris*, the archegonia are more densely crowded and are more numerous than the antheridia, whereas the opposite is true of *Psilotum*. Moreover, antheridia and archegonia of *Tmesipteris* are about twice as large as those of *Psilotum*. Author concludes that the gametophyte generation of the Psilotaceae bears no structural resemblance to that of *Lycopodium* or *Equisetum* and that Psilotaceae are phylogenetically very remote from either Lycopodiales or Equisetales. [See Bot. Absts. 1, Entry 973]—*J. H. Faull.*

SPERMATOPHYTES

288. PULLING, HOWARD E. **Root habit and plant distribution in the far north.** Plant World 21: 223-233. *1 fig.* 1918.—Author discusses root habit of some of the common forest trees of the far north. Recognizes two types of root system, deep and shallow, between which various transitions may occur. Presents evidence that some species have a root habit which is rigidly maintained under varying external conditions, whereas in others the root habit is much more flexible. When the root system is deep and inflexible, the species is obviously unable to grow on shallow soils, such as those prevailing in the far north. Degree of flexibility of root habit and degree of penetration may thus be factors in determining northward distribution of many species. Root systems of black spruce, tamarack and canoe birch are classed as rigid and shallow; of white spruce as flexible and shallow; and of jack pine and white pine as deep and rigid.—*E. W. Sinnott.*

289. SMITH, CHARLES PIPER. **Studies in the genus Lupinus. II. The Microcarpi exclussive of Lupinus densiflorus.** Bull. Torrey Bot. Club 45: 1-23. *16 fig.* 1918.—**Same general title. III. Lupinus densiflorus.** Bull. Torrey Bot. Club 45: 167-203. *25 fig.* 1918.—These studies of *Lupinus* are from the taxonomic standpoint. Many diagrams of floral parts are given to show diagnostic characters.—*Margaret C. Ferguson.*

290. HUMBERT, E. P. **A striking variation in Silene noctiflora.** Bull. Torrey Bot. Club 45: 157-158. *2 fig.* 1918.—Author reports an abnormal seedling in which three seed leaves were produced, and succeeding leaves were arrayed in whorls of three, each leaf of the new whorl being placed above an interval between leaves of the preceding whorl. [See Bot. Absts. 1, Entry 898.]—*V. A. Pease.*

291. HASTINGS, G. T. **Some abnormal poplar flowers.** Torreya 18: 16-18. *4 fig.* 1918. —A case is reported in which several branches of a pistillate tree of *Populus grandidentata* bore catkins made up of staminate, pistillate, and perfect flowers arrayed without regular order, the flowers at the tips of the catkins being most irregular. There is nothing to indicate that the perfect flowers show reversion to ancestral conditions, the explanation lying rather in some irregularity of chromosome division. Drawings of both normal and abnormal flowers are given.—*V. A. Pease.*

PATHOLOGY

DONALD REDDICK, *Editor*

292. BOAS, FRIEDRICH. **Zur Kenntnis des Russtaues der Johannisbeere und verwandter Erscheinungen. [Sooty mould of currants and similar manifestations.]** Zeitschr. Pflanzenkr. 28: 114-116. 1918.—Sooty mould was abundant on currants in 1917. Investigations with microscope and by means of cultures shows that a variety of fungi occur there and in this instance no representative of genus *Fumago* was found. Species of *Dematium* were found oftenest but Cladosporia, sterile mycelia, mucor, yeasts, etc., were found abundantly. Author agrees with Neger (Flora 10: 67. 1917) that *Fumago* sp. is rarely present in sooty moulds. —In greenhouses, on the other hand, sooty mould is almost always *Fumago.*—*D. Reddick.*

293. CHRISTIANSEN, JOHANNE. **Om alkoholdesinfektion. [Alcohol disinfection.]** Hospitalstidende, Kjöbenhavn 1918: 33-34. 1918.—The description of a series of disinfection experiments with various water-soluble antiseptics, various alcohols and acetone. Especial attention is paid to methyl, ethyl and propyl alcohol, with regard to their use as skin disinfectants. The tables and curves, accompanying the paper, show that the molecular percentage of an alcohol in alcohol-water mixture is the dominant factor and independent of the superficial tension in inhibiting bacterial growth, while the actual bacteria-killing properties are solely dependent upon the superficial tension. Propyl alcohol is found superior to ethyl alcohol, which again is superior to methyl alcohol, the higher homologues of the alcohols of

the same series have not been investigated, for the reason, that they do not mix with water in all proportions, so their practical application is out of question. A more extensive use of propyl alcohol in the place of ethyl alcohol as a skin disinfectant is advocated on the basis of the experiments described. [From abst. by G. H[ansen] in Abst. Bact. 2, Entry 775. 1918.] —*D. Reddick.*

294. Dodge, B. O. **Studies in the genus Gymnosporangium. II. Report on culture made in 1915 and 1916.** Bull. Torrey Bot. Club 45: 287–300. *Pl. 8.* 1918.

295. Felt, E. P. **Key to American gall insects.** New York State Mus. Bull. 200. *310 p., 16 pl.* 1917. (1918).—This key is arranged with reference to the host plants on which the galls occur and will be of value to those who have occasion to collect and determine plants or to study abnormal plant growths. It is the only reasonably complete publication of the kind in America. There are a total of 1439 species, most of which can be recognized by means of the key, the 250 text illustrations and the 16 full page plates. The publication is indexed both with reference to the host and the parasite.—*Mel. T. Cook.*

296. Gammie, G. A. **Fungi and disease in plants: A review.** Agric. Jour. India 13: 666–670. 1918.—Review of: E. J. Butler. Fungi and disease in plants.

297. Harvey, R. B. **Hardening process in plants and developments from frost injury.** Jour. Agric. Res. 15: 83–104. *Pl. A [colored] and 7–11.* 1918.—See Bot. Absts. 2, Entries 120, 374.

298. Hemmi, Takeo. **On the Gloeosporiose of Caladium.** [Text in Japanese] Trans. Sapporo Nat. Hist. Soc. 7: 41–70. *Pl. 1.* 1918.—The fungus presents a brown discoloration on the leaves of *Caladium* grown in Japan and finally kills the plant. From many cultural experiments the author notices that the fungus in question grows well on a medium acidified with a relatively strong acid. Especial attention was given to tannic acid. Chlamydospores were frequently present under certain condition of the culture media or in a medium which contained some toxic substance. The optimum temperature for the growth of the fungus is about 27–28°C. the maximum is very near to 38°C. and the minimum about 6–7°C. The fungus liquefies gelatine very slowly. The author proposed the name *Gloeosporium Aracearum,* for the causal fungus.—*T. Matsumoto.*

299. Kunkel, L. O. **Tissue invasion by Plasmodiophora brassicae.** Jour. Agric. Res. 14: 543–572. *Pl. 61–80, fig. 1–2.* 1918.—The work was done to determine the time and nature of infection of crucifers by the club-root organism. It was found that by the use of small paper cylinders or melted paraffin to hold the inoculum in place, not only the roots but also the stems easily become infected. Although clubs may differ greatly in size many of them are alike in shape. They are formed by infection resulting either from direct penetration of the slime-mould, or through distribution of the organism by host cell divisions. The root hairs as a means of entrance are of no importance to *Plasmodiophora brassicae.* After direct penetration the organism follows no special course but moves in all directions through the bark. Probably on account of the abundant supply of food in the cambium, the plasmodia enter the cambial tissue, where they pass through the very thin walls until finally they reach the stem opposite the point where they originally entered. They also spread up and down the stem. The club thus results largely from the abnormal growth of the infected cambium. The invasion into the cambium brings about a lack of development in the xylem tissue, so that on a warm day the leaves are no longer able to obtain as much water as they transpire, and the plant wilts. A ratio of the uninvaded cells and those filled with spores is given, and the question of immunity discussed briefly in relation to the cells not infected. A comparison is made of the galls of *Plasmodiophora brassicae* with those of *Spongospora subterranea* and other genera of the Plasmodiophoraceae, with the conclusion that the other genera produce galls morphologically like those described for *Plasmodiophora brassicae* and unlike those caused by *Spongospora subterranea.*—*Charles Chupp.*

300. Miura, Shikutaro. **On the grain of barley or wheat infected by smut fungus through the flower.** [Text in Japanese.] Ann. Phytopath. Soc. Japan. 1: 16–26. 1918.—The grains of barley and wheat infected by smut through the flowers are smaller than those of healthy ones in length, width, and thickness, as well as lower in weight and specific gravity. The mycelium of the fungus is found in the embryo at least 3 days after infection. Smut spores germinate with difficulty on other portions of a flower than the stigma. From the experiments it is doubtful that the mycelium can enter through the walls of pistils.—*T. Matsumoto.*

301. Schaffnit, E., and G. Voss. **Versuche zur Bekämpfung des Kartoffelkrebses im Jahre 1917. [Investigations in 1917 on control of potato wart.]** Zeitschr. Pflanzenkr. 28: 111–114. 1918.—Attempts were made to kill the organism (*Chrysophlyctis endobiotica)* in the soil by treatment of the soil with the following substances the numbers referring to grams or cubic centimeters per square meter. Potash, 300 and 600; lime nitrogen, 80 and 120; sulfur, 150; sodium cyanide 100; "uspulun," 75; betalysol, 150; chromium acid carbonate, 100; chromium oxid, 100; formaldehyde, 250 and 500. None gave any indication of control. This confirms work in two previous years (Zeitschr. Pflanzenkr. 26: 182 and 27: 339).—Of seventy varieties tested the following, in a test extending over three years, have not shown the disease: Paulsen Juli von 1912, Verb. Lange Sechswocher, Poppehurt, Koralle, Lech, Danusia, Lucya, Ada, Ideal, Jubelkartoffel, Blaue Rhein. Rauhschalen, Agraria, Concordia, Erika, Marschall Vorwärts, Roland.—Tests in a field not cropped with potatoes since 1909 show that the organism persisted in soil for nine years.—*D. Reddick.*

302. Shirai, Mitsutaro. **On the development of plant pathology in Japan.** Ann. Phytopath. Soc. Japan. 1: 1–4. 1918.—A brief historical sketch of plant pathology in Japan, especially in Tôkyô, is given.—*T. Matsumoto.*

303. Wilcox, R. B. **Notes on cranberry disease investigations of the Bureau of Plant Industry.** Proc. Forty-ninth Ann. Conv. Amer. Cranberry Assoc. 1918: 19–21. 1918.—A progress report of investigations on cranberry diseases, largely along the lines of work previously outlined in Bulletin 714 of the U. S. Department of Agriculture, entitled "Spoilage of cranberries after harvest."—*Neil E. Stevens.*

PHYSIOLOGY

B. M. Duggar, *Editor*

DIFFUSION AND PERMEABILITY

304. Williams, Maud. **The influence of immersion in certain electrolytic solutions upon permeability of plant cells.** Ann. Bot. 32: 591–599. 1918.—Cells of the petioles of *Saxifraga umbrosa* immersed in certain concentrations of such electrolytes as aluminum chloride, barium chloride, potassium chloride, potassium nitrate, and barium nitrate, became permeable to 0.2 per cent ferric chloride. Normally these cells are impermeable to ferric chloride of this strength for very long periods. The entrance of the ferric chloride was indicated by its reaction with the tannin contained in the cells. The time of immersion needed to produce abnormal permeability depends upon the concentration and the electrolyte. For aluminum chloride, potassium chloride, potassium nitrate, and barium nitrate results suggest approximately the relation: $\log T = \text{constant} - A\ ((\log C) + 1)$; where T = time of immersion needed to render membrane permeable to 0.2 per cent ferric chloride, C = concentration in gram-mols per liter, A = constant depending upon electrolyte used. Abnormal permeability with regard to the ferric chloride could be produced without the membrane becoming permeable to a rose-colored material frequent in the sap of the cells.—*S. M. Zeller.*

WATER RELATIONS

305. Farmer, J. Bretland. **On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Part I. The evergreens.** Proc. Roy. Soc. London **B**, 90: 218–232. *Fig. 1–2.* 1918.—This paper is abstracted under the following entry, 306.

306. FARMER, J. BRETLAND. **On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Part II. The deciduous plants.** Proc. Roy. Soc. London B, 90: 233–250. *Fig. 1–3.* 1918.—From extensive investigations the methods of which are described in detail, it is found that the efficiency of the wood of evergreens in conducting water is relatively low as compared with that of deciduous plants. Fluctuations in the case of evergreens are relatively small, while with deciduous plants they are sometimes marked. A considerable difference was noted in the water-conducting capacity of normal adult wood and that of "leaders" of young trees, and the wood of arborescent and frutescent monocotyledonous plants proved defective in water-conductivity. [See also the next preceding Entry, 305.]—*R. A. McGinty.*

307. FOLSOM, DONALD. **The influence of certain environmental conditions, especially water supply, upon form and structure in Ranunculus.** Physiol. Res. 2: 209–276. *Fig. 1–24.* 1918. [Abstract of this paper was preprinted as Physiol. Res. Prel. Absts. v. 2, no. 5, serial No. 15, 1918.]—This paper describes extensive experiments along the line indicated by the title. Growing *Ranunculus sceleratus* and *R. abortivus* under conditions of water supply varying from submergence of soil and plant to just enough moisture to support life, it was found that they agreed in regard to their relation to water supply in giving progressively smaller values with progressively lower water supply for the following plant features: thickness of stem cortex, thickness of stem aerenchyma, stem bundle interval, petiolar width of root-leaves, and laminar area of root-leaves. The two species did not show any apparent relation to water supply in regard to number of xylem strands in root and in stomatal frequency of upper surface of root-leaves; and they appeared to disagree in their relation to water supply for the following features: root radius, stelar radius of root, thickness of root aerenchyma, stomatal frequency of lower surface of root-leaves, number of layers of chlorenchyma, thickness of root leaf chlorenchyma, number of layers of root leaf palisade, and thickness of root-leaf palisade. [See Bot. Absts. 1, Entry 1484.]—*R. A. McGinty.*

308. KELSICK, R. E. **Some observations on the relation of lint length to rainfall.** West Indian Bull. 17: 79–82. 1918.—Observations on the lint length of different strains of Sea Island cotton during seasons of varying weather conditions indicate that the length of the lint is dependent upon the water supply of the plant at the critical period of development of the boll.—*R. A. McGinty.*

309. MCCLELLAND, C. K. **The time at which cotton uses the most moisture.** Jour. Amer. Soc. Agron. 10: 185–189. 1918.—Cotton requires less total water than corn or oats. An ample supply of water is needed at the time of blossoming and of setting of the bolls. A small water supply induces plants to blossom early. Plants grown in potometers used the largest amounts of water at the time blossoms were appearing rapidly. Suggestions to the practical grower are attempted.—*H. S. Reed.*

MINERAL NUTRIENTS

310. HENDRY, G. W. **Relative effect of sodium chloride on the development of certain legumes.** Jour. Amer. Soc. Agron. 10: 246–249. 1918.—Observations upon the effect of sodium chloride on varieties of beans grown in sand cultures plus nutrient solutions. The Windsor bean (*Vicia faba*), the blackeye cowpea (*Vigna sinensis*), and the Mexican garbanzo (*Cicer arietinum*) were less injured by sodium chloride than the other varieties tested. The Lewis lima (*Phaseolus lunatus*), and the white tepary (*P. acutifolius* var. *latifolius*) were less affected by sodium chloride than varieties of *Phaseolus vulgaris* tested. Nodule production was checked to a varying degree in all cases observed.—*H. S. Reed.*

311. MCINTIRE, W. H. **The growth of sheep sorrel in calcareous and dolomitic media.** Jour. Amer. Soc. Agron. 10: 29–31. *Pl. 1.* 1918.—Pot culture experiments show that sheep sorrel (*Rumex acetosella*) maintains a good growth in strongly alkaline soil when not subjected to the intervening influence of clover or other lime-loving plants.—*F. F. Halma.*

312. Schreiner, O., and J. J. Skinner. **The triangle system for fertilizer experiments.** Jour. Amer. Soc. Agron. 10: 225–246. *Pl 5–7, fig. 28–41.* 1918.—A description of a method of conducting experiments in field or laboratory which has been found useful, especially where three variables are introduced. Presentation of data by such a diagram gives an intelligent and comprehensive view of the results.—*H. S. Reed.*

313. Shutt, F. T., and E. A. Smith. **The "alkali" content of soils as related to crop growth.** Trans. Roy. Soc. Canada III, 12^{III}: 83–97. *Fig. 1–5.* 1918.

PHOTOSYNTHESIS

314. Moore, Benjamin. **The formation of nitrites from nitrates in aqueous solution by the action of sunlight, and the assimilation of the nitrites by green leaves in sunlight.** Proc. Roy. Soc. London B, 90: 158–167. 1918—The author reports that dilute solutions of nitrates on being exposed to sunlight or other light of short wave-length, underwent conversion from nitrate to nitrite. On immersing green leaves in the solution, comparatively little nitrite accumulated, due, the author concludes, to the fact that the leaf absorbs the nitrites as they are formed, thus indicating that the early stages of synthesis of nitrogenous compounds are carried out in the green leaf aided by sunlight.—*R. A. McGinty.*

315. Moore, Benjamin, and T. A. Webster. **Action of light rays on organic compounds, and the photosynthesis of organic from inorganic compounds in the presence of inorganic colloids.** Proc. Roy. Soc. London B, 90: 168–186. 1918.—Certain inorganic systems, such as solutions of ferric salts, uranic salts, silicic acid, beryllium chloride, etc., in the presence of carbon dioxide and on exposure to light, are able to effect the formation of formaldehyde; while ferrous sulphate, ferrous chloride, zinc chloride and certain other substances do not bring about this action.—Formaldehyde under various conditions, involving light in each case, gave rise by condensation to substances which had the power of reducing Benedict's solution. This indicated that true carbohydrates would ultimately be formed by this means. An effort was made to get an osazone test with the products formed, but this was unsuccessful.—The various sugars, starch, glycogen, egg albumin, milk, and a number of vegetable juices on exposure to sunlight or ultra-violet light showed the presence of formaldehyde, which was assumed to be due to a reversible reaction corresponding to that by which all organic matter has been built up from inorganic sources.—*R. A. McGinty.*

METABOLISM (GENERAL)

316. Hori, S., and U. Bokura. **Soy bean as a substitute for peptone in the preparation of the nutrient media.** Ann. Phytopath. Soc. Japan 1: 27–31. 1918.—Since the outbreak of the war the cost of preparing culture media in mycological and bacteriological laboratories in Japan, especially preparing the culture media for mouse typhus bacteria, has greatly increased, therefore the authors studied many materials in order to find an economic substitute for peptone. After many experiments the conclusion was reached that pulverized soy bean cake gave the most satisfactory results, 30 grams of the material being substituted for 20 grams of peptone. As a matter of fact, on this substitute the mouse typhus bacteria exhibit more vigorous growth than on the peptone media. A comparison of prices, an analysis of total nitrogen, and a brief statement of the method of preparation is given. [See Bot. Absts. 2, Entry 1042.]—*T. Matsumoto.*

METABOLISM (NITROGEN)

317. Bottomley, W. B. **The isolation from peat of certain nucleic acid derivatives.** Proc. Roy. Soc. London B, 90: 39–44. 1918.—A description of methods used in an attempt to isolate nucleic acid from peat is presented, and while no nucleic acid as such was found, the presence of its derivatives is indicative of the decomposition of this compound by bacterial or other agencies.—*R. A. McGinty.*

318. Call, L. E., and M. C. Sewell. **The relation of weed growth to nitric nitrogen accumulation in the soil.** Jour. Amer. Soc. Agron. 10: 35–43. 1918.—It appears from the data

presented that in the past too much emphasis may have been placed on tillage as an agent directly contributing to the formation of nitrates and too little emphasis on it as an indirect means of assisting in the accumulation of nitrates by preventing weeds from using these in their growth.—*F. F. Halma.*

319. Waynick, Dean David. **Variability in soils and its significance to past and future soil investigation. I. A statistical study of nitrification in soils.** Univ. California Publ., Agric. Sci. 3: 240–279. *Fig. 1–2.* 1918.—From a study of variability as regards nitrate production, the author concludes that samples of soil taken from even an apparently uniform field, limited in area, vary so widely as to greatly affect the reliability of any series of results. The results indicate that a single sample of soil is of little value as regards determinations made upon it, and even a number of samples, as ten or sixteen, may give results which have only a low degree of accuracy. In the experiments reported, eighty-one samples were taken from an area 100 feet in diameter, and these gave results which are considered accurate. Increased variability in behavior of samples of soil in the laboratory, over their variability in the field, and its bearing upon the determinations, is discussed.—*R. A. McGinty.*

METABOLISM (ENZYME ACTION)

320. Grey, Egerton Charles. **The enzymes concerned in the decomposition of glucose and mannitol by Bacillus coli communis. Part II. Experiments of short duration with an emulsion of the organisms.** Proc. Roy. Soc. London B, 90: 75–92. *Fig. 1–3.* 1918.—A description is given of methods used in experiments in which it was found that *Bacillus coli-communis*, acting upon glucose in saline solution, gave decomposition products differing quantitatively from those obtained in earlier experiments when the organism was allowed to grow in a mixture of glucose and peptone. The author concluded from the results obtained that succinic acid, acetic acid, and alcohol have a common origin and that lactic acid is formed independently of the formation of the other three products mentioned. It was also found that the enzymes which affect the decomposition of glucose coöperate in the decomposition of mannitol.—*R. A. McGinty.*

321. Grey, Egerton Charles. **The enzymes concerned in the decomposition of glucose and mannitol by Bacillus coli communis. Part III. Various phases in the decomposition of glucose by an emulsion of the organisms.** Proc. Roy. Soc. London B, 90: 92–106. *Fig. 1–2.* 1918.—This paper gives further results of a study of the decomposition products of glucose when acted upon by *Bacillus coli-communis*. It was found that there were several phases of the fermentation which were correlated with increase and diminution in the number of living bacteria present. During one of the phases, i.e., when multiplication of cells was in progress, there was a transformation of glucose into a more complex substance. —*R. A. McGinty.*

GROWTH AND DEVELOPMENT, REPRODUCTION

322. Lees, A. H. **"Reversion" and resistance to "Big Bud" in black currants.** Ann. Appl. Biol. 5: 11–27. *Fig. 1–14.* 1918.—The reversion to the wild type in black currants is characterized by the occurrence of undersized or no fruits, an unusual amount of lateral wood growth, sharp pointed leaves, and long, thin internodes. It is associated with, and apparently caused by, a check to terminal growth brought about by the change of the terminal wood-forming bud into a "Big Bud," a fruit bud, or dead bud. It may be associated with aphis attack. Mite-resistant varieties revert when the wood-forming terminal bud is killed or becomes a fruit bud. Seabrook's Black is mite-resistant because in normal climates and seasons the mite kills the attacked growing point and thus starves itself. This only happens when both climate and variety favor an early and strongly continued check to the growth of the bush. A form of reversion occurring in young bushes before mite or aphis are present is now unaccounted for. Correct pruning and judicious cultural operations are suggested as a possibility for permanent cure.—*S. M. Zeller.* [See Bot. Absts. 2, Entry 1047.]

323. MALLOCK, A. **Growth of trees with a note on interference bands formed by rays at small angles.** Proc. Roy. Soc. London B, 90: 186–199. *Fig. 1–6.* 1918.—A description of an accurate method for the determination of the increase in diameter of trees. The method is based upon observations on the interference bands formed by rays of light at small angles. It was found possible to measure increments in diameter occurring during intervals of one day or even one hour, the lowest measurement specified being 0.025μ-.—*R. A. McGinty.*

324. WALWORTH, E. H., AND L. H. SMITH. **Variations in the development of secondary rootlets in cereals.** Jour. Amer. Soc. Agron. 10: 32–35. 1918.—The number of secondary rootlets in oats, wheat and barley is not constant. Different varieties of a given cereal show characteristic tendencies in the production of these rootlets, and this tendency is greater in barley than in either wheat or oats.—*F. F. Halma.*

GROWTH AND TURGOR MOVEMENTS

325. CROZIER, W. J. [Review of: J. LOEB. **Forced movements, tropisms, and animal conduct.** (See next following Entry, 326.) Monographs on Exp. Biol. 1: 1–209. *Fig. 1–42.* 1918.] Science 49: 171–172. 1919.

326. LOEB, JACQUES. **Forced movements, tropisms, and animal conduct.** Monographs on Exp. Biol. 1: 1–209. *Fig. 1–42.* 1918.—This volume, the first to appear in a proposed series, presents an "analysis of the mechanism of voluntary and instinctive actions of animals" * * * "based on the assumption that all these motions are determined by internal or external forces." The work is of interest to plant physiologists inasmuch as it presents concisely the author's views in the general field, although the data serving as the basis of the analysis are drawn almost exclusively (except in the chapter on chemotropism) from experiments upon animals. [See next preceding Entry, 325.]—*B. M. Duggar.*

327. SMALL, JAMES. **Changes of electrical conductivity under geotropic stimulation.** Proc. Roy. Soc. London B, 90: 349–363. *Fig. 1–14.* 1918.—A report of experiments carried out upon the roots of *Vicia Faba* by means of electrical apparatus. From the results obtained the author believes that the mechanism of geotropic response by the root depends upon permeability changes, since the permeability of the cortical cells of both the upper and under sides of the root-tip increases when the root is placed at an angle with the vertical.—*R. A. McGinty.*

TEMPERATURE RELATIONS

328. MCCOLLUM, E. V. **Influence of heat on growth-promoting properties of food.** Amer. Jour. Public Health 7: 191–194. 1918.—From a number of experiments, the writer draws the conclusion that the growth-promoting properties of food are not seriously affected by the heat necessary in cooking or canning. The two dietary essentials, called fat-soluble A and water-soluble B, the absence of which, according to the author, may bring about the disease beri-beri, are found not to be affected to any great degree by a temperature of 112° to 115°C. —*R. A. McGinty.*

LIGHT RELATIONS

329. BROWNING, C. H., AND SIDNEY RUSS. **The germicidal action of the ultra-violet radiation, and its correlation with selective absorption.** Proc. Roy. Soc. London B, 90: 33–38. *Fig. 1–2.* 1918.—The results of experiments are given in which glass plates similar to ordinary photographic plates were coated with nutrient agar and on these were painted a thin layer of bacterial emulsion. A strip of the plates was then subjected to the action of the ultra-violet spectrum. On incubating the plates at 37°C. for forty-eight hours, it was observed that growth had occurred on part of the exposed strips while none had taken place on the remaining part, the last mentioned result being due to the germicidal action of the rays of that portion of the spectrum striking this part of the plates. The authors concluded from

these observations that ultra-violet radiation between wave lengths 2960 and 2100 Å. V. is germicidal to bacteria and that rays over this range of wave-length are particularly absorbed by the substances of which bacteria are composed.—*R. A. McGinty.*

TOXIC AGENTS

330. Walters, A. L., W. F. Baker, and E. W. Koch. **Studies on protozoöcidal and bactericidal action.** Lilly Sci. Bull. 1: 323–345. 1918.—A report of investigations to determine the effect of solutions of several substances upon the action of certain amoebae and bacteria. Solutions of emetine hydrochloride and several others of cephalline, including cephalline iso-amyl ether phosphate, were used.—*R. A. McGinty.*

MISCELLANEOUS

331. Cook, F. C., and Edwin Le Fevre. **Chemical analyses of bacteriological bouillons.** Amer. Jour. Publ. Health 7: 587–589. 1918.—Analyses of beef juices with and without the addition of peptone suggest a reason, the author believes, why higher bacterial counts are often obtained on media prepared from beef bouillon and why certain organisms will grow on such media which fail to grow on media made from beef extract.—*R. A. McGinty.*

332. Shaw, Walter R. **Some microtechnical methods and devices.** Philip. Jour. Sci. C, 13: 241–259. *Fig. 1–5.* 1918.—A description of modifications of various microtechnical methods used by the author, including the use of micrometers, recording magnification on micrographic negatives, concentration of glycerin hastened by the vacuum pump, making sealed glycerin mounts, washing devices for small objects, estimating the number of cells in spheroidal surfaces, etc. [See Bot. Absts. 2, Entry 483.]—*R. A. McGinty.*

333. Vanderleck, J. **Bacteria of frozen soils in Quebec. II.** Trans Roy. Soc. Canada III, $12^{\text{IV}, \text{V}}$: 1–21. *Pl. 1–5, fig. 1.* 1918.—Results of the previous year stand unchallenged by the data of this paper. The conclusion is that in winter no changes take place in soil. Any action of bacteria depends on the enzymes produced. An extra-cellular enzyme acts as long as the bacteria live, but for the influence of an intra-cellular enzyme active growth is necessary. A superficial study has indicated that ammonification and denitrification are produced by extra- and nitrification by intra-cellular enzymes. This would mean that ammonification and denitrification continue in frozen soils even when bacterial development is at a standstill, while nitrification is impossible.—*S. M. Zeller.*

334. Watson, W. **Sphagna, their habitats, adaptations, and associates.** Ann. Bot. 32: 535–551. *Fig. 1–5.* 1918.—A study of the morphology and ecology of "Sphagna" seems to lead to the conclusion that they obtain their mineral salts from very dilute solutions. They possess a special method of obtaining mineral food by absorbing the base and liberating the acid. In order to do this, special morphological structures apparently of a xerophytic nature furnish the dilute solutions in sufficient quantities and others rid the plants of superfluous acid and water. These structures vary in different groups of *Sphagnum*. During a dry season the intake of water by exposed plants is suspended and the xerophytic structures function to keep the plant in a moist condition until a further supply of dilute solution is available. [See Bot. Absts. 2, Entry 380.]—*S. M. Zeller.*

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. Schramm, *Editor*

BRYOPHYTES

335. Britton, Elizabeth G. **West Indian mosses in Florida.** Bryologist 22: 2. 1919. —The note records an extension of range for two species.—*E. B. Chamberlain.*

336. Nanz, Ralph S. **The southern limit of Eucalypta laciniata.** Bryologist 22: 3. 1919. —The note records the occurrence of the moss near Ithaca, New York.—*E. B. Chamberlain.*

337. Williams, R. S. **Hylocomium alaskanum (L. & J.) Kindb.** Bryologist 22: 1. *Fig. 1–3.* 1919.—Descriptive notes, figures of the leaves, and range are given.—*E. B. Chamberlain.*

338. Williams, R. S. **Archidium cubense sp. nov.** Bryologist 22: 2. 1919.—A description of a new species of moss related to *Archidium ohioense.*—*E. B. Chamberlain.*

FUNGI

339. Dodge, B. O. **Studies in the genus Gymnosporangium. II. Report on cultures made in 1915 and 1916.** Bull. Torrey Bot. Club 45: 287–300. *Pl. 8.* 1918.

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

PTERIDOPHYTES

340. Fitzpatrick, T. J. **The fern flora of northeastern Iowa.** Amer. Fern. Jour. 8: 97–103. 1918.—This is a list with copious notes of ferns and fern allies collected in northeastern Iowa by the author and other fern students.—*Adele Lewis Grant.*

341. Jennings, O. E. **An annotated list of the Pteridophytes of northwestern Ontario.** Amer. Fern Jour. 8: 38–50, 76–88. *Pl. 3, 1 fig.* 1918.—This is an enumeration of the ferns and fern allies collected during five summers spent in northwestern Ontario. A list of the localities explored is included. Two new varieties are described: *Athyrium angustum* (Willd.) Presl. var. *glanduliferum* and *A. angustum* (Willd.) Presl. var. *boreale.*—*Adele Lewis Grant.*

342. Maxon, William R. **Further notes on Pellaea.** Amer. Fern Jour. 8: 89–94. 1918. —Notes on the distribution of several species of *Pellaea* occurring in the United States are recorded. A new name is given to *Pellaea aspera* (Hook.) Baker, i.e., *Cheilanthes horridula.* —*Adele Lewis Grant.*

343. Maxon, William R. **Notes on American Ferns—XII.** Amer. Fern Jour. 8: 114–121. *Pl. 6.* 1918.—*Pellaea densa* Hook. (*Onychium densum* Brack.) is placed under *Cheilanthes* and named *C. siliquosa* Maxon. *P. membranacea* Davenp. is also transferred to *Cheilanthes* as *C. membranacea* Maxon. *C. pyramidalis arizonica* is described as a new subspecies and *Athyrium alpestre* var. *americanum* Butters is raised to specific rank as *A. americanum* (Butters) Maxon.—*Adele Lewis Grant.*

344. Maxon, William R. **A new hybrid Asplenium.** Amer. Fern Jour. 8: 1–3. 1918.—*Asplenium Gravesii*, a natural hybrid between *A. Bradleyi* D. C. Eaton and *A. pinnatifidum* Nutt. is described. The type was collected near Trenton, Georgia,—*Adele Lewis Grant.*

345. Maxon, William R. **Polystichum Andersoni and related species.** Amer. Fern Jour. 8: 33–37. 1918.—Three species occurring on the Pacific Coast are discussed namely, *Polystichum Andersoni* Hopkins, *P. Jenningsi* Hopkins, and *P. alaskense*, the last being described as new.—*Adele Lewis Grant.*

346. Ransier, H. E. **More pleasures from old fields.** Amer. Fern Jour. 8: 8–12. *Pl. 1–2.* 1918.—Variations in the fronds of *Camptosorus rhizophyllus* (L.) Link. are illustrated.—*Adele Lewis Grant.*

347. Rojas Acosta, N. **Addenda ad Floram regionis Chaco australis (pars secunda) [Additions to the flora of the southern Argentina region.]** Bull. Georgr. Bot. 26: 155–165. 1918.—See Bot. Abst. 2, Entry 365.

348. WEATHERBY, C. A. **Pellaea microphylla Mett. ex Kuhn.** Amer. Fern Jour. 8: 104–108. *Pl. 5.* 1918.—From a study of *Pellaea microphylla* Mett. in the light of recent collections the author concludes that it is a valid species quite distinct from *P. pulchella* Fée with which it has been hitherto associated.—*Adele Lewis Grant.*

349. VAN ALDERWERELT VAN ROSENBURGH, C. R. W. K. **New or interesting Malayan ferns 10.** Bull. Jard. Bot. Buitenzorg 28: 1–56. *Pl. 1–8.* 1918.—Under the above title the author presents the results of extended studies in the Filicales and Lycopodiales. Many new species, varieties, and forms are described, and new combinations made among the ferns proper and in the genera *Lycopodium* and *Selaginella.*—*J. M. Greenman.*

350. VAN ALDERWERELT VAN ROSENBURGH, C. R. W. K. **Two critical fern genera.** Bull. Jard. Bot. Buitenzorg 28: 57–64. *Pl. 9.* 1918.—A brief discussion is given of *Angiopteris* Hoffman and *Lecanopteris* Blume, accompanied by a key to the Malayan species of these genera.—*J. M. Greenman.*

351. VAN ALDERWERELT VAN ROSENBURGH, C. R. W. K. **Two new fern genera.** Bull. Jard. Bot. Buitenzorg 28: 65–66. *Pl. 10.* 1918—Two new genera are proposed namely, *Nematopteris* with one species, *N. pyxidata,* based on *Scleroglossum pyxidatum* v. A. v. R. (*ibid.* 16: 37. *Pl. 9.* 1914) and *Thysanobotrya* also with one species, *T. arfakensis,* based on *Polybotrya arfakensis* Gepp in Gibbs Contrib. 71.—*J. M. Greenman.*

SPERMATOPHYTES

352. BUSCALIONI, LUIGI, AND GIUSEPPE MUSCATELLO. **Studio monografico sulle Specie americane del Gen. Saurauia, Willd. [A monographic study of the American species of the genus Saurauia Willd.]** Malpighia 28: 315–330. 1918.—Buscalioni and Muscatello continue their consideration of the genus *Saurauia*; and the present article consists mainly in contrasting certain species and varieties already published, particularly *S. leucocarpa* Schlecht., *S. pedunculata* Hook., *S. Rusbyi Britt.*, *S. barbigera* Hook., *S. pseudopringlei* Busc. and its variety *fluviatilis* Busc., *S. pseudopedunculata* Busc. and *S. pauciflora* Rose.—*J. M. Greenman.*

353. CARDOT, J. **Rosacées nouvelles d'extréme-orient.** [New Rosaceae from the far-east]. Not. Syst. 3: 345–352. 1918.—The following new species and new varieties are described: *Pirus Halliana* Voss. var. *obtusiloba, P. laosensis, P. Pashia* Ham. vars. *obtusata,* and *grandiflora, P. Koehnei* Schneid. var. *crossotocalyx, P. Jacquemontiana* Dcne. var. *longipes, P. granulosa* Bertol. var. *turbinata, P. astateria, P. coronata, P. thibetica, P. hypoglauca, P. glabrescens, P. oligodonta, P. Monbeigii,* and *P. foliosa* (Wall. p. p.) var *subglabra.*—*J. M. Greenman.*

354. CONZATTI, CASIANO. **Exploracion botanica por la costa meridional de Oaxaca. [Botanical exploration from Oaxaca to the southern coast.]** Bol. Dir. Estud. Biol. 2: 309–325. *Pl. 7.* 1918.—The author gives an account of a botanical expedition from the City of Oaxaca to Puerto Angel on the southern coast of the State of Oaxaca. The article is illustrated by several photographic reproductions and a map showing the itinerary. A list of the plants collected is appended.—*J. M. Greenman.*

355. GAGNEPAIN, F. **Eugenia nouveau d'Indo-Chine.** [New Eugenia from Indo China.] Not. Syst. 3: 321–336. 1918.—The present pages continue from a previous number of the Notulae (*ibid.* 316–320. 1917) the enumeration of new species of *Eugenia* from Indo China. The following species are published as new to science: *Eugenia circumcissa, E. cochinchinensis, E. compongensis, E. Deckerii, E. eburnea, E. Finetti, E. glomerulata, E. Harmandii, E. laosensis, E. laosensis* var. *quocensis, E. leucocarpa, E. mekongensis, E. nigrans, E. pachysarca, E. Pierrei, E. resinosa, E. Tramnion, E. sphaerantha, E. Thorelii, E. tinctoria, E. tonkinensis,* and *E. Zimmermannii* Warburg.—*J. M. Greenman.*

356. HUTCHINSON, J. **Erlangea aggregata.** Curtis's Bot. Mag. *Pl. 8755.* 1918.—This new species of the Compositae is described and illustrated from specimens grown at the Royal Botanic Gardens, Kew, England. It is a native of Angola, southwestern Africa.—*Adele Lewis Grant.*

357. JUMELLE, HENRI. **Les Dypsis de Madagascar. [The Dypsis of Madagascar.]** Ann. Mus. Col. Marseille III, **6**: 21–38. *Pl. 3.* 1918.—The author presents a synoptical revision of *Dypsis*, a small genus of the Palmaceae. Nineteen species are recognized as occurring in Madagascar, of which the following are published as new: *Dypsis manaranensis*, *D. procera*, *D. littoralis*, *D. angusta*, *D. viridis*, *D. linearis*, *D. pleurisecta*, *D. monostachya*, *D. masoalensis*, *D. fasciculata*, and *D. longipes*.—*J. M. Greenman.*

358. LECOMTE, HENRI. **Genre nouveau de Sapotacées. [A new genus of the Sapotaceae.]** Not. Syst. **3**: 336–345. *Text fig. 2.* 1918.—*LeMonniera* is published as a new genus from Africa. Three species are recognized namely, *LeMonniera ogouensis* (*Mimusops ogouensis* Pierre, *Lecomtedoxa ogouensis* Dubard) from French Congo, *L. clitandrifolia* (*Mimusops clitandrifolia* A. Chev.) from the Ivory Coast, and *L. Batesii* (*Mimusops Batesii* Engl.) from Cameroon.—*J. M. Greenman.*

359. MAIDEN, J. H. **The forest flora of New South Wales.** Vol. VII. Part 2 [Part LXII of the complete work], pp. 39–75. *Pl. 232–235.* 1918. William Applegate Gullick. Sydney. —The present part contains descriptions, notes, and illustrations of *Brachychiton acerifolius* F. v. M., *Eucalyptus rostrata* Schlecht., *Acacia Mabellae* Maiden, *Callistemon salignus* DC., and *C. brachyandrus* Lindley. A chapter is also included under the caption "Adventitious roots (including notes on stilt-roots, lenticels, pneumataphores; swamp plants)," illustrated by several photographic reproductions.—*J. M. Greenman.*

360. MARLOTH, RUDOLF. **Notes on the genus Mystropetalon Harv. (Balanophoraceae).** South African Jour. Sci. **14**: 278–286. *Fig. 1–18.* 1918.—From the study of a series of specimens, the author concludes that there is only one valid species of *Mystropetalon* namely, *M. Thomii* Harv. The other published species, *M. Polemanni* Harv. and *M. Sollyi* Harvey-Gibson, represent two extreme forms and are reduced to synonymy.—*Adele Lewis Grant.*

361. NELSON, J. C. **A new form of Prunella vulgaris.** Amer. Bot. **24**: 82–85. 1918.—The author describes a white-flowered form occurring in Oregon, as *Prunella vulgaris* L. var. *calvescens* Fernald forma *alba*.—*Adele Lewis Grant.*.

362. OCHOTERENA, ISAAC. **Una nueva especie de Mamillaria. [A new species of Mamillaria.]** Bol. Dir. Estud. Biol. **2**: 355–356. *Fig. 1–3.* 1918.—A new species of cactus, *Mamillaria Ocamponis*, is described and figured from Mexico.—*J. M. Greenman.*

363. PAU, C. **Hieracios catalenes. [Hieraciums of Catalonia].** Bol. R. Sc. Española Hist. Nat. **18**: 505–507. 1918.—Record is made of several species and varieties of *Hieracium* occurring in northeastern Spain, and two new hybrids are characterized. These have been designated binomially as follows: *Hieracium ortomixtum* (*H. murorum* L. var. × *Neocerinthe* Pau) and *H. abadesicolum* (*H. murorum* L. var. > *Neocerinthe* Pau).—*J. M. Greenman.*

364. PAU, D. CARLOS. **Notas sueltas sobre la flora matritense. [Notes on the flora of Madrid].** Bol. Soc. Aragonesa Ciienc Nat. **17**: 150–156, 190–197, 208–211. 1918.—The author continues his records on the Spanish flora and gives copious notes. Several new species and varieties are characterized.—*J. M. Greenman.*

365. ROJAS ACOSTA, N. **Addenda ad Floram regionis Chaco australis (pars secunda).** [Additions to the flora of the southern Argentina region.] Bull. Geogr. Bot. **26**: 155–165. 1918.—The following new species of vascular cryptogams and seed-plants are described: *Adiantum fossarum*, *Polypodium medicinale*, *Epidryopteris lycopodiomus*, *Lilaea superba*,

Bambusa chacoensis, *Aropsis palustris* gen. et sp. nov. Aracearum, *Herreria tuberosa*, *Coryphomia tectorum*, *Commelina cyanantha*, *Nidularium hydrophorum*, *Quesnelina chacoensis*, *Stenorrhynchum vulnerarium*, *Ficus speciosus*, *F. Rojasi* Lévl., *Cecropia ambaci*, *Momisia spinifera*, *Sapium Rojasi* Lévl., *Nectandra nigra*, *Coccoloba corrientina*, *Petiviera corrientina*, *Rollinia odoriflora*, *Bulnesia Gancedoi*, *Sida Rojasi* Lévl., *Platorheedia pacuri*, and *Lepicochlea americana*.—*J. M. Greenman.*

366. Roldan, Angel. **Los Arboles indigenas que ataca el muerdago en el Valle de Mexico. Datos para la flora forestal del Distrito Federal. [The indigenous trees which are attacked by the mistletoe in the Valley of Mexico. Data for a forest flora of the Federal District].** Mem. Soc. Alzate 37: 17–21. 1918.—The author discusses some of the facultative parasites occurring on certain trees in the Valley of Mexico. *Phoradendron brachystachyum* Oliv. is found on *Alnus acuminata* HBK. and *P. velutinum* Oliv. attacks *Crataegus*, *Casimiroa*, *Fraxinus*, *Prunus*, *Quercus*, and *Salix*.—*J. M. Greenman.*

367. Rolfe, R. A. **Angraecum gracilipes.** Curtis's Bot. Mag. *Pl. 8758.* 1918.—A new white-flowered epiphytic orchid, native of Madagascar, is described and illustrated from specimens grown at the Royal Botanic Gardens, Kew, England. It has been confused hitherto with *A. recurvatum* Thouars.—*Adele Lewis Grant.*

368. Rolfe, R. A. **Bulbophyllum sociale.** Curtis's Bot. Mag. *Pl. 8761.* 1918.—*Bulbophyllum sociale* is described and illustrated from specimens grown in the Royal Botanic Gardens, Kew, England. The plant was originally imported from Sumatra.—*Adele Lewis Grant.*

369. Schaffner, John H. **Additions to the catalog of Ohio vascular plants for 1917.** Ohio Jour. Sci. 18: 99–100. 1918.

370. Smith, J. J. **Die Orchideen von Java. Fünfter Nachtrag. [The orchids of Java. Fifth supplement].** Bull. Jard. Bot. Buitenzorg 26: 1–135. 1918.—The present article includes descriptions of the following orchids published as new to science: *Nervillea Winckelii*, *Lecanorchis panciflora*, *L. multiflora*, *Oberonia nitidicauda*, *Microstylis lobatocallosa*, *M. purpureonervosum*, *M. cuprea*, *M. longidens*, *M. foetida*, *Liparis angustiflora*, *Agrostophyllum tenue*, *Ceratostylis sululata* Bl. var. *flavescens*, *Dendrobium exsculptum* T. & B. var. *purpureum*, *D. Jacobsonii*, *E. tjadasmalangensis*, *E. Koordersii*, *Bulbophyllum tjadasmalangense*, *B. javanicum* (*Epicrianthes javanica* Bl.), *B. scotiifolium*, *B. peperomiifolium*, *B. distans*, *B. Winckelii*, *B. hamatipes*, *B. submarmoratum*, *B. gomphreniflorum*, *B. rubiferum*, *Phalaenopsis javanica*, *Chroniochilus tjidadapensis* gen. et sp. nov., *Sarcochilus fraternus*, *Thrixspermum roseum*, *T. batuense* J. J. S. var. *javanicum*, *Saccolabiopsis Bakhuizenii* gen. et sp. nov., *Saccolabium galbinum*, *Trichoglottis Winkleri* J. J. S. var. *minor*, *T. maculata*, *Sarcanthus flaccidus*, *Microsaccus affinis*, *Microtatorchis javanica*, *M. papillosa*, *Taeniophyllum proliferum*, *T. Bakhuizenii*, *T. radiatum*, *T. aurantiacum*, and *T. rostellatum*.—*J. M. Greenman.*

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ENTRIES 371-639

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

371. CONNER, S. D. **Soil acidity as affected by moisture conditions of the soil.** Jour. Agric. Res. 15: 321-330. Nov., 1918.—The effect of one-fourth, one-half and full saturation of the soil with water, on the acidity determined by potassium-nitrate and calcium acetate methods. Results show measurable difference in acidity due to different moisture conditions. This paper not primarily ecological but is of value in connection with the distribution of plants on wet or acid soil.—*H. L. Shantz.*

372. DIELS, L. **Das Verhältnis von Rhythmik und Verbreitung bei den Perennen des europäischen Sommerwaldes. [The relation between periodicity and geographic distribution in perennials of European forests.]** Ber. Deutsch. Bot. Ges. 36: 337-351. *5 fig.* Oct., 1918.—Author potted various herbaceous perennials in autumn, transferred them to cool but frost-free glass-houses, and set them in the open in the summer, carrying the experiment over two years. The species exhibited three types of behavior in response to the changed environment. 1. The *Asperula* type includes plants which remain continuously in vegetative activity. The species are chiefly southern in range and belong to prevailingly tropical families. Their usual winter rest is not rhythmic but is a direct result of cold. 2. The *Leucojum* type includes plants which begin their activity in autumn, finish it in spring, and have a summer resting period. They are chiefly of Mediterranean origin, and, while normally rhythmic in their activity, the actual time of the resting period is determined by the environment. 3. The *Polygonatum* type continues to rest during the winter even in the greenhouse, and merely resumes activity earlier in the spring than would occur out of doors. The species are chiefly holarctic in distribution, belonging to extra-tropical families, and their periodicity is in direct correlation with the seasons. Author infers that other types of behavior may also occur.—*H. A. Gleason.*

373. GUPPY, H. B. **Plant distribution from the standpoint of an idealist.** Jour. Bot. 56: 112-113. Apr., 1918.—An appeal is made for coöperation between the supporters of Darwin and DeVries, it being argued that in Mesozoic times mutation was probably the more important mode of evolution, whereas other modes of evolution may now be more important. With the greater mutability in older times we may associate the rise of the great families of angiosperms, while in the more modern times adaptivity has taken a larger place, and with this we may associate the differentiation into species. Families in their distribution largely ignore the cleavage of the lands into two great masses, and thus point back to an epoch of pre-differentiation. The cleavage between the continents, however, is shown in genera and

even more in species, being connected with the more modern epoch of differentiation. The Dicotyledons show greater detachment from the tropics than do Monocotyledons, the Sympetalae standing foremost in regard to such detachment.—*H. C. Cowles.*

374. HARVEY, R. B. **Hardening process in plants and developments from frost injury.** Jour. Agric. Res. 15: 83–112. *6 pl., 3 fig.* Oct., 1918.—A review of the literature and a discussion of frost injury. Frost is first indicated in succulent leaves such as cabbage by the withdrawal of water from cells and the displacement of the air in intercellular spaces. Frozen cells of cabbage, *Bryophyllum*, *Salvia* and lettuce show growth stimulus and produce tumors, while tomato, *Coleus* and geranium tissues are killed. In cabbage peroxidase and hydrogen-ion concentration are more pronounced in frozen than in normal cells. Exposure of cabbage to a temperature of +3°C. for five days hardened the plants to such an extent that they were not frozen when subjected to −3°C. for over half an hour. This hardening is due to some changes in the protoplasm, such as increase in hydrogen-ion concentration and salt content, which prevent the precipitation of the protoplasm. The carbohydrate changes accompanying hardening were slight.—The effect of desiccation, freezing and plasmolysis are considered to be similar. [See Bot. Absts. 2, Entry 120.]—*H. L. Shantz.*

375. JENNINGS, O. E. **Notes on the mosses of northwestern Ontario. I. Sphagnum.** Bryologist 21: 69–78. *Pl. 27, 1 map.* 1918—The first of a series of papers relating to the bryophytes of the northernmost section of the "North Shore" of Lake Superior and a large area of the contiguous interior. Twelve species of *Sphagnum* are recorded, together with copious notes regarding geographic range, local occurrence, and observed ecological relations. [See Bot. Absts. 1, Entry 1418.]—*G. E. Nichols.*

376. MACCAUGHEY, VAUGHAN. **A survey of Hawaiian coral reefs.** Amer. Nat. 52: 409–438. *9 fig.* June–July, 1918.—There is included in this report a brief consideration of the zonal distribution of the principal marine algae associated with the coral reefs. Species of green, brown and red algae are included, the last being most abundant.—*Geo. D. Fuller.*

377. MACCAUGHEY, VAUGHAN. **An ecological survey of the Hawaiian pteridophytes.** Jour. Ecol. 6: 199–219. Nov., 1918.—The Hawaiian Islands have 44 genera and 190 recorded species of pteridophytes of which two genera, *Diellia* and *Sadleria*, and 125 species are endemic; 33 species are cosmopolitan, 20 center in the South Pacific and 6 have their chief distribution in America. In the distribution of these plants upon the different islands of the group the author finds evidence in support of the hypothesis that the westward islands are older and have been longer isolated than the eastern. The different species are classified according to the ecological zone in which they occur, their altitudinal ranges are given and the more decidedly hygrophytic, mesophytic and xerophytic forms are grouped. An annotated list of species and a bibliography complete the article.—*Geo. D. Fuller.*

378. POLLOCK, JAMES B. **Blue-green algae as agents in the deposition of marl in Michigan lakes.** Michigan Acad. Sci. 20: 247–260. *Pl. 16–17.* 1918.—See Bot. Absts. 2, Entries 555, 623.

379. SKOTTSBERG, CARL. **Genom Canadas växtgeografiska provinser. [Through Canada's phytogeographic provinces.]** Fauna och Flora 1918: 1–21. *11 fig.* 1918.—This paper presents the impressions gained by the author in a transcontinental trip through Canada. The species are rather fully cited. Among the places visited were forests and flood plains near Ottawa, Stony Mountain at Winnipeg, the Rockies at Banff, Lake Louise, the Kicking Horse River, the Illecillewaet Glacier, and Albert Canyon.—*A. L. Bakke, H. C. Cowles.*

380. WATSON, W. **Sphagna, their habitats, adaptations, and associates.** Ann. Bot. 32: 535–551. *5 fig.* Oct., 1918.—This paper is primarily an attempt to demonstrate a correlation between the morphological and ecological characters of the sphagnums. The sphagnums

possess various structural peculiarities which may seem to be of a xerophytic nature. The characters specified as such are compactness of habit, imbrications of leaves, concave leaves with hooded or inrolled apical portions, formation of capillary chambers along which water passes, papillosity of the cell wall, intermixture of dead empty cells with living chlorophyllous ones, and presence of reservoirs that serve to store water. These peculiarities are variously developed in different groups of sphagnum, but an attempt to make a comparative correlation between the structure of different plants and the wetness of their habitats leads to inconsistencies and anomalies. Other factors than the degree of wetness influence the distribution of the sphagnums, and the most important of these is the acidity of the water with which they are in contact. The sphagnums obtain their mineral salts from very dilute solutions. They apparently possess a special method of mineral nutrition by which the base of a salt is absorbed and the acid liberated. Various of the apparently xerophytic structural devices are thought to be correlated primarily with this peculiar method of nutrition. During periods of drought, when absorption by exposed plants is suspended, the xerophytic devices act as such, keeping the plant in a moist condition until a further supply of dilute solution is available. [See Bot. Absts. 2, Entry 334.]—*G. E. Nichols.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

381. HILTON, HUBER C. **Furrow planting upon the sand plains of Michigan.** Jour. Forestry 16: 915–919. December, 1918.—Furrow planting under ordinary weather conditions has been a success with Norway pine 2–0 and 2–1 stock at a cost of from $2.00 to $2.40 an acre. Survivals of from 87 to 96 per cent are secured, as even under unfavorable weather conditions the trees, being below the level of the surrounding soil cover, can better withstand a period of drought. The furrows also serve as fire guards and can remain unplanted for two years, as no vegetation comes in during that time and there is no erosion.—*E. N. Munns.*

382. PEARSON, G. A. **The relation between spring precipitation and height growth of western yellow pine saplings in Arizona.** Jour. Forestry 16: 677–689. *3 fig.* Oct., 1918.—Western yellow pine in northern Arizona makes its height growth during the period of lowest precipitation in the year. During this period of great activity the trees are dependent almost entirely upon moisture stored in the soil since the preceding winter and spring. Normally the great bulk, and in some years all, of this moisture is accumulated during the winter months, December-March. When winter precipitation constitutes the sole supply, height growth in young saplings is apt to be small. If winter precipitation is supplemented by 2 inches or more in April and May (the rainfall in June is rarely sufficient to be of any consequence), a pronounced stimulus to height growth results. It may be stated as a general rule for the sites covered by this study, that 2 inches or more of precipitation between April 1 and May 31 is several times as effective as the same amount in excess of the normal precipitation between December 1 and March 31. Factors reflecting atmospheric conditions between April 1 and June 30, including evaporation, wind movement, relative humidity, cloudiness, and length of rainless period, show a close, though not entirely consistent, relation to height growth. Temperature on the sites studied appears to be important only in so far as it affects moisture conditions. Since rise in temperature results in increased water consumption, height growth varies inversely with temperature when, as is usually the case, there is a shortage of moisture. Observations indicate that where moisture is abundant, height growth increases directly with higher temperature.—*G. A. Pearson.*

383. LINN, EDWARD R. **Silvical systems in spruce in northern New Hampshire.** Jour. Forestry 16: 897–908. December, 1918.—Conditions in old cuttings in the hardwood type, spruce-slope type and spruce-flat type are described, where the cuttings were made by different methods of the diameter limit and clean cutting. The defects of the rigid diameter limit and how to secure reproduction are discussed, and it appears that clean cutting, if carefully done, may lead to better reproduction than is commonly supposed.—*E. N. Munns.*

384. Singh, Puran. **A note on the economic value of the Chinese tallow tree (Sapium sebiferum).** Indian Forester 44: 383–388. Sept., 1918. The tallow tree may become an important source of vegetable tallow and drying oil. These products should be manufactured with the aid of solvent extraction, for the yield by the steaming process is 50 per cent less than by the solvent method. There is a very small amount of dye-principle in the leaves but not enough to warrant extraction. Due to the presence of ammonia, the leaves should be a valuable fertilizer.—*E. N. Munns.*

GENETICS

George H. Shull, *Editor*

385. Anonymous. **A cross between a raspberry and a dewberry.** Jour. Heredity 9: Frontispiece. *1 fig.* Dec., 1918. Illustration of hybrid from *Rubus rubiesetus* (dewberry) ♀ × *R. strigosus* (red raspberry) ♂, made by H. Ness, Texas Agric. Exp. Sta. F_1 gave 280 uniform plants but only 5 fully fertile. 1000 F_2 plants appear uniform and similar to parents. Fruit is dark red to nearly black. Flavor suggests raspberry, very superior to blackberry. —*Merle C. Coulter.*

386. Banta, Arthur M. **The extent of the occurrence of sex intergrades in Cladocera.** Anat. Rec. 15: 355–356. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918.]—Sex intergrade strains of *Simocephalus vetulus* have been reared in the laboratory for three years (65 generations). These all came from the offspring of a single individual. Notwithstanding careful microscopic examination of thousands of individuals of all the laboratory strains (15) of this species, particularly during the last twenty months, no other sex intergrades have been found either in the strain which produced them originally or in any of the other strains of *Simocephalus.*—About twenty months ago sex intergrades were found in one of the strains of *Daphnia longispina* and from these we have propagated sex intergrade strains for some 36 generations. During the next few months sex intergrades were found (sparingly and only after the microscopic examination of thousands of individuals) in all except one of the six strains of this species under cultivation. Sex intergrade strains derived from three distinct strains of this species are being propagated. Two or three sex intergrades were also seen in a strain of this species in 1915 but no young were secured from them.—Long and continued search of great numbers of individuals of 18 strains of *Daphnia pulex*, 7 strains of *Simocephalus serrulatus*, and of 11 strains of three species of *Moina* has not revealed a single sex-intergrade individual. Hence in these species as well as in *Simocephalus vetulus* the occurrence of sex intergrades is apparently a rare phenomenon. Sex intergrades are relatively rare in *Daphnia longispina* as well, although laborious search has revealed them, mostly a single individual to a strain, in five of six strains. Once established, however, intergrade strains continue indefinitely the production of sex intergrades.—In the literature there is, presumably, only a single mention of the finding of sex intergrades (R. de La Vaulx). In view of the large number of workers with *Cladocera* and the extensive experimental work on this material the fact that there has been apparently only a single occurrence of sex intergrades in other laboratories speaks further for the restricted occurrence of these interesting sex forms.—*A. M. Banta.*

387. Baur, E. Rev. of: H. W. Siemens. **Biologische Terminologie und rassenhygienische Propaganda. (Biological terminology and eugenical propaganda.)** Arch. Rass. Ges. Biol. 1917: 257. 1917.] Zeitschr. Abstamm. Vererb. 19: 311–312. Aug., 1918.—Siemens has proposed a logical nomenclature to supplant the more or less confused terminology which has grown up in genetical literature. Reviewer thinks that owing to shifting conceptions it is better to retain the present terminology with shifting significance of terms. He especially objects to substitution of "idiophor" for "gene."—*G. H. Shull.*

388. Baur, E. [Rev. of: H. W. Siemens. **Die biologischen Grundlagen der Rassenhygiene und der Bevölkerungspolitik. (The biological principles of race hygiene and of eugen-**

icalpolicy.) *8vo, 80 p., 8 fig.* J. F. Lehmann: München. 1917.] Zeitschr. Abstamm. Vererb. 19: 312. Aug., 1918.—Reviewer considers this popular presentation important in view of lack of biological training among physicians, sociologists and social workers. Author uses his new terminology. [See next preceding Entry, 387.], but gives also synonymy with current terminology. All technical expressions are, throughout, very well "verdeutscht."—*Geo. H. Shull.*

389. Baur, E. [Rev. of: Zade, A. **Der Hafer. Eine Monographie auf wissenschaftlicher und praktischer Grundlage. (Oats. A monograph on scientific and practical principles.)** *8vo, 355 p., 32 fig.* Fischer: Jena, 1918. (See Bot. Absts. 2, Entry 467.)] Zeitschr. Abstamm. Vererb. 20: 52–53. Sept., 1918.

390. Brotherton, W. E. **Note on inheritance in Phaseolus.** Ann. Rept. Michigan Acad. Sci. 20: (1918): 152. 1919.

391. Castle, W. E. **Is the arrangement of the genes in the chromosome linear?** Proc. National Acad. Sci. U. S. Amer. 5: 25–32. *2 fig., 1 diagram.* Feb., 1919.—See Bot. Absts. 2, Entry 658.

392. Castle, W. E. **The linkage system of eight sex-linked characters of Drosophila virilis (data of Metz).** Proc. National Acad. Sci. U. S. Amer. 5: 32–36. *Fig. 3–4.* Feb., 1919.—See Bot. Absts. 2, Entry 659,

393. Cobb, Frieda. **A case of Mendelian segregation in Oenothera pratincola.** Ann. Rept. Michigan Acad. Sci. 20 (1918): 151. 1919.

394. C[ole], L. J. **A laboratory manual for genetics.** [Rev. of: Babcock, E. B., and J. L. Collins. **Genetics laboratory manual.** First edition. *xi + 56 p.* McGraw-Hill Book Co. Inc.: New York, 1918.] Jour. Heredity 10: 39–40. Jan., 1919.

395. Coulter, John M., and Merle C. Coulter. **Plant genetics.** *19 × 13 cm., ix + 214 p., 40 fig.* Univ. Chicago Press: Chicago. July, 1918.—Authors state book is neither technical presentation of genetics nor general text, but course of general lectures adapted to initiate young botanists into point of view of working geneticists. Discusses theories of Darwin, Weismann, and deVries; inheritance of acquired characters; Mendel's laws; "neo-Mendelism," including presence and absence hypothesis, factor hypothesis, blends, inheritance of quantitative characters, practical aspect of cumulative factor hypothesis, linkage and crossing-over. So-called non-Mendelian inheritance and somatic segregation are also considered. Experiments of Castle and Jennings are cited in reference to modification of unit characters. Briefly considers investigations of sex phenomena in algae, fungi, liver-worts, mosses and seed plants, as well as physiological and chromosome theories of sex determination; evidence from cytology and breeding for and against chromosomes as bearers of hereditary factors. Parthenogenesis and vegetative apogamy are considered in regard to bearing on genetical experiments. Points out advantages of lower plants as material for genetical experiments because (1) in them reproductive phenomena are not obscured by so many complexities; (2) would test theories of inheritance derived from study of sporophyte involving theoretical mechanism for segregation of factors. Chapters on self sterility and endosperm in inheritance. Favors view that semi-sterility may be due to Mendelian factor. [See Bot. Absts. 1, Entry 1471.]—*E. E. Barker.*

396. Coulter, John M. **Embryo sac and fertilization in Oenothera.** [Rev. of: Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 279–317. 1918. (See Bot. Absts. 1, Entries 482, 979, 980.)] Bot. Gaz. 67: 275–276. Mar., 1919.

397. Coulter, Merle C. **Breeding for disease resistance.** [Rev of: (1) Evans, I. B. P. **South African cereal rusts with observations on the problem of breeding rust resistant wheats.** Jour. Agric. Sci. 4: 95–104. 1911. (2) Stakman, E. C., John H. Parker, and F. J. Piemeisel.

Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance? Jour. Agric. Res. 14: 111–123. *Pl. 13–17.* 1918. (See Bot. Absts. 1, Entry 500).] Bot. Gaz. 67: 273. Mar., 1919.

398. De Vries, Hugo. **Oenothera rubrinervis, a half mutant.** Bot. Gaz. 67: 1–26. Jan., 1919.—*Oenothera rubrinervis* (a "half mutant" from *Oe. Lamarckiana,* produced by combination of mutated gamete with normal *velutina* gamete) when self-fertilized produces in every generation about one-fourth empty seeds, "mass mutation" of about one-fourth double mutants (*O. deserens,* which breeds true and produces no empty seeds), and one-half *O. rubrinervis,* which repeats splitting. Author concludes *deserens* is repetition of initial mutation which produced *rubrinervis* from *Lamarckiana.* According to author's view *Lamarckiana* produces two kinds of gametes, in consequence of secondary mutability into *velutina,* the *velutina* being linked to lethal factor which kills it in young seeds. Assuming that mutation into *deserens* occurred in typical gametes, leaving *velutina* unchanged, *rubrinervis,* like *Lamarckiana,* must have two types of gametes, both of them in a mutated condition—*deserens* without a lethal factor, and *velutina* with one. In self-fertilization of *rubrinervis,* copulations of *deserens* gametes among themselves produce *deserens, velutina* among themselves give empty seeds, and combinations of the two types of gametes give *rubrinervis* with its splitting capacity. Proof of above conception is given by results of self-fertilizations and crosses.—*Oe. oblonga* is mutation analogous to *rubrinervis,* arising through mutation of normal *Lamarckiana* gametes, leaving *velutina* gametes unchanged, but mutated gametes must be assumed to be suppressed in its pollen. *Oe. nanella* seems to arise through mutations in *velutina* gametes of *Lamarckiana.* [See Bot. Absts. 1, Entry 1478.]—*Frieda Cobb.*

399. Ellinger, Tage. [Rev. of: Jennings, H. S. **The numerical results of diverse systems of breeding.** Genetics 1: 53–89. 1916. Zeitschr. Abstamm. Vererb. 19: 205. June, 1918.

400. Federley, Harry. [Rev. of: (1) Metz, Charles W. **Chromosome studies on the Diptera.** 2. **The paired association of chromosomes in the Diptera and its significance.** Jour. Exp. Zoöl. 21: 280. *8 pl.* 1916. (2) Idem. [Same general title.] 3. **Additional types of chromosome groups in the Drosophilidae.** Amer. Nat. 50: 587–599. *1 pl.* 1916.] Zeitschr. Abstamm. Vererb. 19: 211–213. June, 1918.

401. Federley, Harry. [Rev. of: Punnett, Reginald Crundall. **Mimicry in butterflies.** *188 p., 16 pl.* Cambridge Univ. Press: Cambridge, England, 1915.] Zeitschr. Abstamm. Vererb. 19: 213–215. June, 1918.

402. Franz, V. [Rev. of: Haecker, Valentin. **Über eine entwicklungsgeschichtlich begründete Vererbungsregel. (On a law of inheritance based on embryology.)** Mitteil. Naturforsch. Ges. 4. 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 93–95. 1918.

403. Franz, V. [Rev. of: Haecker, Valentin. **Zur Eigenschaftsanalyse der Wirbeltierzeichnung. (Analysis of the distinctive color markings of vertebrates.)** Biol. Zentralbl. 36: 448–471. 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 93–95. 1918.

404. Freudenberg, Richard. [Rev. of: Roemer, Th.] **Über die Befruchtungsverhältnisse verschiedener Formen des Gartenkohles (Brassica Oleracea L.) (On the fertilization relationship of different forms of garden cabbage—Brassica oleracea L.)** Zeitschr. Pflanzenzücht. 4: 125–141.] Zeitschr. Abstamm. Vererb. 19: 222–223. June, 1918.

405. Ghigi, Alessandro. **Ricerche sull' incrociamento del Gallus sonnerati con polli domestici.** Mem. R. Acc. Bologna 8^{III}: 1–16. *1 pl.* Abstract from Ibis 1: 134. Jan., 1919. —"In this memoir Professor Ghigi states the results of his experiments in crossing the two species of Jungle-Fowl *Gallus sonnerati* and *G. gallus* and also various members of the domes-

tic races. All of these he finds completely fertile with one another through several generations. From this he deduces the conclusion that our domestic races are not, as has been believed by Charles Darwin and many other writers, monogenetic and descended solely from *Gallus gallus* (= *G. bankiva* auct.), but that they are bigenetic and have been derived from both *G. gallus* and *G. sonnerati*.—Details of the hybrids and of their Mendelian inheritance are given, and the plate illustrates the feather-characters of the pure strains and of the various crosses."

406. GOEDEWAAGEN, M. A. J. [Rev. of: F. BACO. **Variations d'un hybride sexual de vigne par sa greffe sur l'un de ses procréateurs. (Variations of a sexual hybrid of the grape, when grafted onto one of its parents.)** Compt. Rend. Acad. Sci. Paris 163: 712–714. Jan., 1916.] Genetica 1: 98. Jan., 1919.

407. GOEDEWAAGEN, M. A. J. [Rev. of: L. DANIEL. **Influence de la greffe sur les produits d'adaptation des Cactées. (Influence of grafting on the adaptive products of the Cactaceae.)** Compt. Rend. Acad. Sci. Paris 164: 318–323. 1917.] Genetica 1: 106. Jan., 1919.

408. GRAEVENITZ, v. [Rev. of: KAJANUS. **Zur Genetik der Samen von Phaseolus vulgaris. (Genetics of the seed of Phaseolus vulgaris.)** Zeitschr. Pflanzenzücht. 2: 378–388. 1913.] Zeitschr. Abstamm. Vererb. 20: 60. Sept., 1918.

409. GRAEVENITZ, v. [Rev. of: FROST, HOWARD B. **The inheritance of doubleness in Matthiola and Petunia I. The hypothesis.** Amer. Nat. 49: 623–635. 1915.] Zeitschr. Abstamm. Vererb. 20: 56–57. Sept., 1918.

410. HANCE, ROBERT T. **Variations in the number of somatic chromosomes in Oenothera scintillans de Vries.** Genetics 3: 225–275. *5 fig., 7 pl.* May, 1918.—Somatic cells contain from 15 to 21 chromosomes, the higher numbers resulting chiefly from fragmentation of some of larger of the 15 fundamental chromosomes of the species. Special methods of measurement were developed which showed typically series of 7 pairs and one unpaired chromosome. A member of a pair differs from one of next shorter pair by about 9 per cent of its length. Fragments were smaller than unpaired chromosome which is shortest of the 15 chromosomes in the fundamental group and it was possible to associate fragments with the chromosomes from which they were derived. The sum of length of chromosomes is same whether number be 15 or more. Fragmentation was not observed in cells of germinal line. Two classes of gametes are developed possessing respectively 7 and 8 chromosomes, the unpaired chromosome passing to one of the poles at reduction division. Same relative length relations exist between chromosomes of haploid group as between pairs of diploid group. Total chromosome length in the 8-chromosome gametes differs from that of 7-chromosome gamete by length of the additional unpaired chromosome. Characters of *Oe. scintillans* are associated with the unpaired chromosome since union of two 7-chromosome gametes gives *Lamarckiana* with 14 chromosomes. A type resembling *oblonga* is thrown by *scintillans* in addition to *Lamarckiana* and it is suggested that this plant may be result of union of two 8-chromosome gametes, giving zygote with 16 chromosomes.—*B. M. Davis.*

411. HERIBERT-NILSSON, NILS. **Experimentelle Studien über Variabilität, Spaltung, Artbildung and Evolution in der Gattung Salix. [Experimental studies on variability, segregation, speciation and evolution in the genus Salix.** Lunds Universitets Årsskrift N. F. (Afd. 2) 14 (No. 28): 1–145. *65 fig.* 1918.

412. HERIBERT-NILSSON, N. [Rev. of: KLEBAHN, H. **Formen, Mutationen und Kreuzungen bei einigen Onotheren aus der Lüneburg Heide. (Forms, mutations and crosses in several Oenotheras from the Lüneburg heath.)** Jahr. Hamburg Wiss. Anstalt 31: 1–64. *11 pl.* 1913.] Zeitschr. Abstamm. Vererb. 20: 46–48. Sept., 1918.

413. HERIBERT-NILSSON, N. [Rev. of: NILSSON-EHLE, H. **Hveteförädlingen för Svealand. (Wheat improvement for Svealand.)** Sveriges Utsädesfören. Tidskr. 26: 5–23. 1916.] Zeitschr. Abstamm. Vererb. 20: 50. Sept., 1918.

414. Holmes, S. J., and C. M. Doud. **The approaching extinction of the Mayflower descendants.** Jour. Heredity 9: 296–300, 335. Nov., 1918.—Review of biographical study of Mayflower families and of special study made by the California branch of the Society of Mayflower Descendants. Study shows steady decline in size of Mayflower families. Genealogy of the Brewster family is analyzed. Decline in family size has been especially rapid during last fifty years. Suggested that Society of Mayflower Descendants consider means of conserving their stock. [See Bot. Absts. 1, Entry 1511.]—*H. H. Laughlin.*

415. Hyde, Roscoe R. **Correlation of fertility and fecundity in an inbred stock.** Anat. Rec. 15: 355. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918.]—Over 95 per cent of the eggs isolated from a mating of the wild *Drosophila ampelophila* gave rise to mature flies. On inbreeding the fertility rapidly declined. The fecundity of the female was not affected in this way. The correlation between the number of eggs which a female lays and the percentage which gave rise to mature flies is very low. This would seem to indicate that the sterility as it affects the female bears no causal relation to reduced fertility.—*R. R. Hyde.*

416. Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 279–317. April, 1918.—See Bot. Absts. 1, Entries 482, 979, 980. [Rev. in Bot. Gaz. 67: 275, 276. Mar., 1919.]

417. Isserlis, L. **On a formula for the product-moment coefficient of any order of a normal frequency distribution in any number of variables.** Biometrika 12: 134–139. Nov., 1918.—For a frequency distribution involving two variables, reduced product moment is correlation coefficient. Present author proves in Biometrika 12, Part III that in case of a normal distribution in four variables, the product moment is sum of products of correlation coefficients two at a time. Present paper generalizes this result for any even number of variables: reduced product moment is sum of products of correlation coefficients, each term involving all variables. As important special cases, values of mixed moment coefficients of any order in each variable can be deduced.—*R. B. Robbins.*

418. Isserlis, L. **Formulae for determining the mean values of products of deviation of mixed moment coefficients in two to eight variables in samples taken from a limited population.** Biometrika 12: 183–184. Nov., 1918.—Gives formulae for expected deviation of product moments in many samples of given size from mean of product moments, in terms of the observed product moments, total number of individuals and number in samples. [See Bot. Absts. 1, Entry 1515.]—*R. B. Robbins.*

419. Lenz, F. [Rev. of: Federley, Harry. **Die Vererbung des Raupendimorphismus von Chaerocampa elpenor L. (The inheritance of the pupal dimorphism of Chaerocampa elpenor L.)** Öfversigt af Finska Vetenskaps-Soc. Förhandl. 58: 13. 1915–16.] Zeitschr. Abstamm. Vererb. 19: 215–216. June, 1918.

420. Love, H. H., and G. P. McRostie. **The inheritance of hulllessness in oat hybrids.** Amer. Nat. 53: 5–32. *7 fig.* Jan.-Feb., 1919.—Crosses between hullless oats (*Avena nuda*) and hulled varieties were studied. Hullless forms differ from hulled in three important characters: 1. Kernel is loose or free within hull; 2. Rachillae of three- to many-grained spikelet are so elongated that uppermost grains are borne above the empty glumes; 3. Glumes and lemmas are similar in texture.—F_1 types were intermediate in that both types of kernels hulled and hullless, are formed on same plant. Type of panicle resembles hullless parent more than hulled. There are, however, fewer hulled than hullless kernels on F_1 panicles.—Although F_2 ratios deviate from 3:1 they indicate that this character behaves as simple monohybrid. In F_3 pure hulled and hullless plants bred true, while intermediate types gave approximately 1 hulled: 2 intermediate: 1 hullless. Percentage of hulled kernels on heterozygous F_3 plants varied from about 3 to more than 90. Thus, while the usual 1:2:1 ratio obtained, some factor

or factors seemed to affect heterozygous forms so as to modify amount of hulled or hullless kernels present. Some of the work was therefore continued (beyond F_2) in attempt to answer in general two questions: 1. Does percentage of hulled plants obtained from any heterozygous parent vary with percentage of hulled kernels possessed by that parent? 2. Do hulled and hullless kernels of heterozygous plant give approximately same results in their offspring? Some families did not give ratios close to 1:2:1, and those plants having high percentage of hullless kernels tended to produce relatively high number of hullless plants. Thus degree of hulllessness as expressed by percentage may influence segregation in following generations. Percentage of hulled kernels on parent form influences amount of hulled condition in heterozygous offspring. Average percentage of offspring agrees closely with that of parent forms. —In order to answer second question, seed of F_2 heterozygous plants were separated into two lots, hulled and hullless, and planted separately, and their segregation ratios separately determined. In *both* cases results agreed closely with 1:2:1 expectation, and there was no evident relation between kind of kernel (hulled or hullless) sown from a heterozygous plant, and offspring produced.—There is some reason for assuming the case to be one of multiple factors in which one primary factor pair determines hulled or hullless condition, and other factors influence hulled condition of those plants *only* that are heterozygous for the primary factors. However, condition of F_1 plants is not in agreement with such hypothesis, for all F_1 plants observed contained fewer hulled kernels than hullless. Results of different series are rather conflicting and it does not seem possible at present to explain all of them on simple multiple factor hypothesis. It is thought there may be some combinations which have tendency to produce an excess of hullless kernels, thus influencing type of distribution.—*John H. Parker.*

421. MacCardy, H. M. **Nuclear reorganization and its relation to conjugation and inheritance in Arcella vulgaris.** Anat. Rec. 15: 356–357. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists, Baltimore, December 27, 1918.]—The data from pedigreed cultures of *Arcella vulgaris* maintained from September, 1917, to August, 1918, have given the following conclusions: 1. A given individual produces a limited number of daughter cells. The number varies from none to twenty-seven (the highest found). 2. These daughter cells and in turn their offspring behave in a similar way with the exceptions indicated. 3. After a period of fairly regular successive vegetative divisions, a period of "depression" occurs. Some of the features marking this period are: reduced activity (feeding, locomotion, division), "punctate" shells, "empty" shells, increased mortality. These are incidental, not essential. 4. Individuals passing successfully through this period may give rise to a new line unlike that from which it came—a marked change in size, for example. This is a "mutation." On the other hand, the new may be like the old line. A new period of vegetative divisions sets in and continues until another period of depression is reached. 5. While some members of a line are "depressed," others conjugate. 6. In pedigreed cultures of exconjugants the two members of the pair tend to produce the same numbers of daughter cells. This is in agreement with the fission rate of exconjugants in Paramoecia (Jennings). 7. In lines derived from exconjugants, after a period of vegetative divisions, individuals pass again into another period of depression, when the changes noted above and (or) conjugation may be repeated. 8. Preparations of cells made during "depression," and of conjugating cells show remarkably similar conditions of both chromidial net and nuclei. Old nuclei are broken up and new nuclei are formed. This is the period of nuclear reorganization. This may occur within a single individual or through conjugation of two individuals. (In both permanent and temporary mounts.) 9. The inheritance of size shows changes at these periods in individual lines. 10. The following modifying factors should be mentioned: Cultural conditions influence the procedure—unfavorable conditions appear to hasten "depression" and very favorable conditions to delay it. The different nuclei do not always divide at the same time or pass through similar stages together. There is also evidence to show that the essential change may occur with no great break in the usual course of events, and the new arise almost or quite imperceptibly.—*H. M. McCardy.*

422. MacInnes, L. T. **The testing of pure-bred cows in New South Wales.** Jour. Heredity 9: 307–335. Nov., 1918.—Traits of milk and butter-fat production are hereditary. Author's effort during four years of testing to define these traits in families has brought encouraging results. Tables indicate increased productiveness of 20 per cent in butter and 25.5 per cent in milk.—*R. K. Nabours.*

423. Morgan, T. H. **Several ways in which gynandromorphism in insects may arise.** Anat. Rec. 15: 357. Jan. 20, 1919.—[Author's abstract of paper read before American Society of Zoologists, Baltimore, December 27, 1918.]—Gynandromorphs have appeared in *Drosophila* 3 times in 16,637 flies; 32 times in 42,409; 2 times in 4,979 and 3 in 24,000; thus in the ratio of 1 to 2200. There is evidence that nearly all of them start as females; 19 were more female than male; 14 were half male and half female; and 6 were more male than female. Practically all the cases found are demonstrably due to elimination of one sex-chromosome soon after fertilization. A few call for other chromosomal relations. Rarely one may even have begun as a male, but nearly all cases supposed at first to belong to this category have proved to be due to mutation in the sex-chromosome. All cases of hybrid gynandromorphs found in bees can also be explained by the theory of chromosomal elimination. A few cases in *Drosophila* seem to be explicable only on the assumption of a bi-nucleated egg, and this explanation is the only one found so far that will give a consistent explanation of Toyama's two gynandromorphs in the silkworm moth. Bi-nucleated eggs have been described by Doncaster in other moths.—*T. H. Morgan.*

424. Newman, C. C., and L. A. Leonian. **Irish potato breeding.** South Carolina Agric. Exp. Sta. Bull. 195. *28 p., 19 fig.* 1918.—See Bot. Absts. 2, Entry 693.

425. Ostenfeld, C. H. [Rev. of: Lotsy, J. P. **Evolution by means of hybridization.** Nijhoff: s'Gravenhage. 1916. Zeitschr. Abstamm. Vererb. 20: 42–45. Sept. 1918.

426. Ostenfeld, C. H. [Rev. of: Lotsy, J. P. **La quintessence de la théorie du croisement. (The quintessence of the theory of crossing.)** Arch. Néerland. 3: 351–353. 1917. (See Bot. Absts. 2, 439.)] Zeitschr. Abstamm. Vererb. 20: 46. Sept., 1918.

427. Rasmuson, H. [Rev. of: Rosen, D. **Zur Theorie des Mendelismus. 1. Über scheinbare Koppelungs- und Abstossungsphänomene bei gewissen polymeren Spaltungen. 2. Über den analytischen Wert von Rückkreuzungen. (To the theory of Mendelism. 1. On apparent coupling and repulsion-phenomena in certain polymeric segregations. 2. On the analytical value of back crossing.)** Bot. Notiser 1916: 289–298. 1916.] Zeitschr. Abstamm. Vererb. 19: 207. June, 1918.

428. Scheppegrell, William. **Susceptibility to hay fever, and its relation to heredity, age, and seasons.** U. S. Public Health Rep. 1918: 1191–1196. July 19, 1918.—Since pollens causing hay fever are inhaled by all within their radius, but only 1 per cent of population are affected, it would seem that those subject have idiosyncrasy making them susceptible. Investigation of 415 cases showed that 36.5 per cent had relatives of first degree (father, mother, brother, sister) who also suffered from hay fever.—*J. P. Kelly.*

429. Schiemann, E. [Rev. of: Malinowski, E. **Über die durch Kreuzung hervorgerufene Vielförmigkeit beim Weizen.** (On the variability of wheat induced by crossing) Extrait Compt. Rend. Soc. Sci. Varsovie 9: 733–756. 1916.] Zeitschr. Abstamm. Vererb. 19: 219. June, 1918.

430. Schiemann, E. [Rev. of: Lehmann, E. **Bakterienmutationen Allogonie. Klonumbildungen. (Mutations in Bacteria. Allogony. Clone formation.)** Centralbl. Bakt. Parasit. 1916: 289–300. 1916.] Zeitschr. Abstamm. Vererb. 20: 60–61. Sept., 1918.

431. Schiemann, E. [Rev. of: Revis, C. **Variation in Bacterium coli.** Proc. Roy. Soc. London 86: 373–376. 1913.] Zeitschr. Abstamm. Vererb. 20: 61–62. Sept., 1918.

·432. Schiemann, E. [Rev. of: Simon, J. **Über die Verwandtschaftsverhältnisse der Leguminosen-Wurzelbakterien. (On the relationships among the root-nodule Bacteria of the Leguminosae.)** Centralbl. Bakt. Parasit. 1914: 470–479. 1914.] Zeitschr. Abstamm. Vererb. 20: 62–63. Sept., 1918.

433. Schouten, S. L. [Dutch Rev. of: Beyerinck, M. W. **De enzymtheorie van de erfelijkheid. (The enzyme theory of heredity.)** Versl. gew. Verg. K. Akad. Wet. (Wis. Natuurk.) Amsterdam 25: 1231–1245. 1917.] Genetica 1: 98–100. Jan., 1919.

434. Siemens, Herman W. [Rev. of: Lenz, Dr. Fritz. **Eine Erklärung des Schwankens der Knabenziffer. (An explanation of the decrease in number of boys.)** Arch. Rassen- u. Gesellschaftsbiol. 11: 629. 1914–15.] Zeitschr. Abstamm. Vererb. 19: 208–209. June, 1918.—See Bot. Absts. 2, Entry 48.

435. Sirks, M. J. **De kritische punten van het evolutievraagstuk. [Critical points of the evolution hypothesis.]** Genetica 1: 70–91. Jan., 1919.

436. Sirks, M. J. [Rev. of: Gates, R. R. **Heredity and mutation as cell phenomena.** Amer. Jour. Bot. 2: 519–528. 1915.] Zeitschr. Abstamm. Vererb. 19: 203–204. June, 1918.

437. Sirks, M. J. [Rev. of: Honing, J. A. **Variabiliteit der bastardsplitsing.—Variabilität der Bastardspaltung. (Variability of hybrid splitting.)** Versl. gew. verg. K. Akad. Wet. (Wis. Natuurk.) Amsterdam 25: 794–804. Nov., 1916.] Zeitschr. Abstamm. Vererb. 19: 204–205. June, 1918.

438. Sirks, M. J. [Rev. of: Lotsy, J. P. **Over Oenothera Lamarckiana als type van een nieuwe groep van organismen, die der Kernchimären, benevens beschouwingen over de waarde der genenhypothese in de erfelykheids- en evolutieleer. Über Oenothera Lamarckiana als Typus einer neuen Gruppe von Organismen, derjenigen der Kernchimären, nebst Betrachtungen über den Wert der Genenhypothese in der Vererbungs- und Evolutionslehre. [On Oenothera Lamarckiana as type of a new group of organisms, that of the nuclear chimeras, and speculations concerning the value of the genotype hypothesis in the study of heredity and evolution.** *52 p., 2 pl.* Nyjhoff: s'Gravenhage. 1917.] Zeitschr. Abstamm. Vererb. 20: 48–49. Sept., 1918.

439. Sirks, M. J. [Rev. of: (1) Lotsy, J. P. **La quintessence de la théorie du croisement. (The quintessence of the theory of crossing.)** Arch. Néerland. Sci. 3: 351–353. 1917. (See Bot. Absts. 2, Entry 426.) (2) Idem. **L'Oenothera de Lamarck (Oenothera Lamarckiana de Vries) considérée comme chiméra nucléaire. (Lamarck's Oenothera (Oenothera Lamarckiana de Vries) considered as a nuclear chimera.)** Arch. Néerland. Sci. 3: 324–350. 1917.] Zeitschr. Abstamm. Vererb. 20: 49–50. Sept., 1918.

440. Sirks, M. J. [Rev. of: Mayer-Gmelin, H. **De kruising van roode ongebaarde spelt met fluweelkaf Essex-tarwe, een voorbeeld van Factoren-analyse.—Die Bastardierung von rotem unbegranntem Spelz mit Essexsammetweizen, ein Beispieleiner Faktorenanalyse. (Crossing of a red unbearded spelt with velvet-chaff Essex wheat, an example of factorial analysis.)** Cultura 29: 141–159. *2 pl.*] Zeitschr. Abstamm. Vererb. 20: 51. Sept., 1918.

441. Sirks, M. J. [Rev. of: Lotsy, J. P. **Het verband tusschen onze opvatting omtrent het ontstaan der sorten en wetenschappelyke teelt.—Die Beziehungen zwischen unserer Auffassung der Artentstehung und wissenschaftlicher Züchtung. (The relation between our conception of the origin of species and scientific breeding.)** Med. d. Vereenig. tot bevorder. van wetenschappelyke teelt in Nederland 7: 1–33. *2 pl.* 1917. Zeitschr. Abstamm. Vererb. 20: 53. Sept., 1918.

442. Sirks, M. J. [Rev. of: Tjebbes, K. **De veredeling van de suikerbiet. (Zuckerrübenzüchtung). (Improvement of the sugar beet.)** Med. d. Vereenig. tot bevorder. van wetenschappelyke teelt in Nederland 8: 1–28. *6 fig.* 1917.] Zeitschr. Abstamm. Vererb. **20:** 53–54. Sept., 1918.

443. Sirks, M. J. [Rev. of: Sirks, M. J. **Stérilité, auto-inconceptibilité et differentiation sexuelle physiologique.—Sterilität, Selbstunempfänglichkeit und physiologische Geschlechtsdifferentiation. (Sterility, self-incompatibility and physiological differentiation of the sexes.)** Arch. Néerland. Sci. 3: 205–234. 1917.] Zeitschr. Abstamm. Vererb. **20:** 58–59. Sept., 1918.

444. Sirks, M. J. [Rev. of: Reese, A. N. **Variations in the vermilion spotted newt, Diemyctylus virescens.** Amer. Nat. 50: 316–320. 1916.] Zeitschr. Abstamm. Vererb. **20:** 63. Sept., 1918.

445. Sirks, M. J. [Rev. of: Kroon, H. M. **De kruisingen in de huistierteelt in Nederland, getoest aan de tegenwoordige begrippen over erfelykheid.—Die Bedeutung der Bastardierung in der Niederländischen Haustierzüchtung, an dem gegenwärtigen Vererbungsstandpunkte geprüft. (Hybridization in the breeding of domestic animals in Holland, tested on the basis of present views of heredity.)** Med. d. Vereenig. tot bevorder. van wetenschappelyke teelt in Nederland 6: 1–62. 1917. Zeitschr. Abstamm. Vererb. **20:** 63–64. Sept., 1918.

446. Sirks, M. J. [Rev. of: Nichols, J. T. **On primarily unadaptive variants.** Amer. Nat. 50: 565–574. 1916.] Zeitschr. Abstamm. Vererb. **20:** 64. Sept., 1918.

447. Smith, L. H. **Outline of a plan for corn breeding.** Illinois Agric. Exp. Sta. Circ. 221. *4 p.* 1918.—See Bot. Absts. 2, Entry 711.

448. Spillman, W. J. [Rev. of: Babcock, E. B., and R. E. Clausen. **Genetics in relation to agriculture.** (See Bot. Absts. 1, Entries 210, 220, 244.)] Jour. Heredity 9: 361. Dec., 1918.

449. Stark, Mary B. **An hereditary tumor.** Jour. Exp. Zoöl. 27: 509–529. *3 pl.* Feb., 1919.—See Bot. Absts. 2, Entry 1249.

450. Stark, Mary B. **An hereditary tumor in the fruit fly, Drosophila.** Jour. Cancer Res. 3: 279–301. *1 pl., 2 fig.* July, 1918.—See Bot. Absts. 2, Entry 1248.

451. Sturtevant, A. H. **An analysis of the effects of selection.** Carnegie Inst. Washington Publ. 265. *18 × 26 cm., 68 p., 1 pl., 14 fig.* Washington, D. C., 1918.—Dichaete, a mutant race of *Drosophila melanogaster*, was selected in both directions for bristle number. Both plus and minus lines were obtained. By means of linkage tests, using known and readily classifiable characters, these plus and minus lines were shown to differ in definite modifying factors. Modifiers were found to exist in the second and also in the third chromosome. Specific evidence was obtained, showing that contamination of allelomorphs did not occur. The cases adduced since 1914, especially by Castle, as evidence that contamination occurs in other forms, are analyzed in detail. Author concludes that modification of genes by selection or contamination has never been demonstrated, and is not in accord with the experimental results. Hypothesis of modifying factors has been experimentally verified in certain of these cases, and is sufficient to account for results obtained by its opponents.—*T. H. Morgan.*

452. Tammes, Tine. [Rev. of: (1) Beijerinck, M. W. **De enzymtheorie der erfelijkheid. (The enzyme theory of heredity.)** Versl. gen. Verg. K. Akad. Wet. Amsterdam. 25: 1231. 1917. (2) Idem. **The enzyme theory of heredity.** Proc. Kon. Akad. van Wetensch. Amsterdam, 19: 1275. 1917.] Zeitschr. Abstamm. Vererb. 19: 202–203. June, 1918.

453. Tammes, Tine. [Rev. of: Kapteyn, J. C. **Skew frequency curves in biology and statistics.** Receuil Trav. Bot. Néerland. 13: 105–157. 1916.] Zeitschr. Abstamm. Vererb. 19: 205–206. June, 1918.

454. Tammes, Tine. [Rev. of: Bateson, W. **Note on experiments with flax at the John Innes Horticultural Institution.** Jour. Genetics 5: 199–201. 1915–16. Zeitschr. Abstamm. Vererb. 20: 50. Sept., 1918.

455. Tammes, Tine. [Rev. of: Surface, Frank M. **On the inheritance of certain glume characters in the cross Avena fatua × A. sativa var. Kherson.** Proc. National Acad. Sci. U. S. Amer. 2: 478–484. *1 fig.* 1916. Zeitschr. Abstamm. Vererb. 20: 51–52. Sept., 1918.

456. Tammes, Tine. [Rev. of: Saunders, Edith R. **A suggested explanation of the abnormally high records of doubles quoted by growers of stocks (Matthiola).** Jour. Genetics 5: 137–158. 1915–16. Zeitschr. Abstamm. Vererb. 20: 54. Sept., 1918.

457. Tammes, Tine. [Rev. of: Saunders, Edith R. **On the relation of half-hoariness in Matthiola to glabrousness and full hoariness.** Jour. Genetics 5: 145–158. 1915–16.] Zeitschr. Abstamm. Vererb. 20: 54–55. Sept., 1918.

458. Tammes, Tine. [Rev. of: Saunders, Edith R. **On selective partial sterility as an explanation of the behavior of the double-throwing stock and the Petunia.** Amer. Nat. 50: 486–498. 1916.] Zeitschr. Abstamm. Vererb. 20: 55–56. Sept., 1918.

459. Tammes, Tine. [Rev. of: Gates, R. R. **On pairs of species.** Bot. Gaz. 61: 177–212. *12 pl.* 1916.] Zeitschr. Abstamm. Vererb. 20: 57–58. Sept., 1918.

460. Tammes, Tine. [Rev. of: Child, C. M. **Studies on the dynamics of morphogenesis in experimental reproduction and inheritance. 9. The control of head-form and head-frequency in Planaria by means of potassium cyanide.** Jour. Exp. Zoöl. 21: 101–125. 1916.] Zeitschr. Abstamm. Vererb. 20: 58. Sept., 1918.

461. Thiem. [Rev. of: Hertwig, Oscar. **Das Werden der Organismen. Eine Widerlegung von Darwins Zufallstheorie. [The "becoming" of organisms. An argument against Darwin's chance-theory.]** *710 p., 115 fig.* G. Fischer: Jena, 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 81–93. 1918.

462. Ubisch, G. v. **Kritische Betrachtungen zur Hypothese der primären und sekundären Koppelung. [Critical consideration of the hypothesis of primary and secondary coupling.]** Zeitschr. Abstamm. Vererb. 19: 193–201. *3 fig.* June, 1918.—See Bot. Absts. 3, Entry 298.

463. Ubisch, G. v. [Rev. of: (1) Lehmann, E. **Art, reine Linie, isogene Einheit. [Species, pure line, isogenic unit.]** Biol. Centralbl. 24: 285–294. 1914. (2) Lotsy, J. P. **Prof. E. Lehmann über Art, reine Linie, isogene Einheit. [Prof. E. Lehmann on species, pure line, isogenic unit.]** *Ibid.* 24: 614–618. 1914. (3) Lehmann, E. **Art, reine Linie, isogene Einheit. II. Species, pure line, isogenic unit. II.]** *Ibid.* 25: 555–560. 1915.] Zeitschr. Abstamm. Vererb. 20: 41–42. Sept., 1918.

464. Weatherwax, Paul. **Improved technique for corn pollination.** Proc. Indiana Acad. Sci. 1917: 105–107. *2 fig.* 1918.—See Bot. Absts. 3, Entry 301.

465. Weatherwax, Paul. **Variation and varieties of Zea Mays.** Proc. Indiana Acad. Sci. 1917: 99–103. 1918.—See Bot. Absts. 3, Entry 300.

466. Weatherwax, Paul. **Gametogenesis and fecundation in Zea Mays as the basis of xenia and heredity in the endosperm.** Bull. Torrey Bot. Club 46: 73–90. *Pl. 6–7, 2 fig.* Mar., 1919.—See Bot. Absts. 2, Entry 717.

467. Zade, A. **Der Hafer. Eine Monographie auf wissenschaftlicher und praktischer Grundlage. [Oats. A monograph on scientific and practical principle.]** *8 vo., 355 p., 32 fig.* Fischer: Jena, 1918.—Book written from standpoint of practical agriculture but contains chapters on the cultural history, relationship, derivation, and varietal classification of oats. Opposes Nilsson-Ehle's view that his supposed mutations which resembled the wild oat (*Avena fatua*), were true mutations, and holds that they were results of crossing with the wild oats. [From rev. by E. Baur in Zeitschr. Abstamm. Vererb. 20: 52–53. Sept., 1918.]—*G. H. Shull.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. Sinnott, *Editor*

THALLOPHYTES

468. Janet, Charles. **Sur le Botridium granulatum.** Compt. Rend. Acad. Sci. Paris 166: 960–963. *13 fig.* 1918.—*Botridium granulatum* is described as arising from motile zoospores or non-motile aplanospores ('propagules'). The reproductive cell gives rise to a spherical vesicle, with chloroplasts and nuclei imbedded in a peripheral cytoplasmic layer, the central part of the vesicle being filled with a clear liquid. The development of the mature plant from this "blastea syncitiale" is by an outgrowth upward to form the cylindrical or pyriform aereal part and other outgrowths downward to form the rhizoids. The non-motile aplanospores arise by the transformation of the protoplasmic stratum of certain vesicles into minute cells each of which becomes a "propagule." The vesicle bursts open and the aplanospores are scattered by the rain. They germinate immediately. In zoospore formation the protoplasm of the vesicle shows marked increase in the number of chloroplasts and nuclei. The chloroplasts elongate and a nucleus becomes associated with each. The cytoplasm immediately around each associated nucleus and chloroplast becomes delimited by a membrane. A single flagellum is formed, the zoospore swims for a short time, becomes quiescent and develops into a new plant in the same manner as the aplanospores.—In a few individuals, late in the growing season, strong suggestions of sexual reproduction are seen. A portion of protoplasm, provided with a nucleus and chloroplasts becomes separated from the rest by a membrane, appearing first like a zoospore mother cell. This cell, however, develops at once, within the mother plant to form a hollow spherical vesicle, absorbing all of the remaining protoplasm. The contents of this vesicle divide up into minute bodies, some of which were observed to have a distinct red stigma. Although none were seen with cilia nor was there any evidence of fusion of these bodies the author is of the opinion that they are gametes. —*F. A. McAllister.*

469. Yendo, Kichiasaburo, and Jiro Ikari. **Auxospore formation of Chaetoceras debile Cleve.** Bot. Mag. Tôkyô 32: 145–149. *Pl. 2 (8 fig).* 1918—All stages in auxospore formation occurred in great abundance in April, 1918, at the Marine Laboratory of Oshoro. The authors were able to observe complete series and to follow the entire development of individual auxospores and their subsequent germination. The whole process occupied about seven hours. Their account confirms the earlier reports of Schultz and Gran. The asexual auxospores are formed by the contraction of the cell contents and migration through an oval lateral pore. The extruded protoplast remains attached to the old filament, where it increases in size and then begins division at right angles to the old filament. The new filaments have a diameter nearly twice that of the auxospore-forming filaments.—*Leonas L. Burlingame.*

BRYOPHYTES

470. Douin, C., and Douin, R. **Le Reboulia Raddi.** Rev. Gén. Bot. 30: 129–145. *5 fig.* 1918.—*Reboulia* is autoicous, sometimes becoming apparently dioicous by the abortion of one sexual apparatus; it is never paroicous. Genus is distinguished from other Marchantiaceae by formation of male receptacle toward apex of a ventral or subfloral branch, female receptacle appearing at apex of a separate branch which has developed apically from male-

producing shoot. Under exceptional conditions a thallus may terminate in a female receptacle without having borne a male one; or of two branches resulting from a dichotomy, one may bear a female, the other a male, receptacle.—Three species are recognized, two of them new; they are distinguished by structure of female receptacles, character of spores, and position of male receptacles.—*Rays* are defined as divisions of female head which protect the piliferous cavities; *lobes*, as those parts which cover and protect the involucres. On this basis, the greater number of species of *Marchantia* and all species of *Preissia* have rays only, those of *Preissia* being much reduced; *Lunularia, Clevea, Sauteria,* and *Peltolepis* have neither rays nor lobes; the remaining species of *Marchantia* (for which a separate genus, *Marchantiopsis*, is proposed), and all other genera of Marchantiaceae have lobes only, their rays being rudimentary or indistinct. [See Bot. Absts. 1, Entry 1047.]—*C. E. Allen.*

PTERIDOPHYTES

471. BROWN, J. G. **Prothallia of Tmesipteris.** [Reviw of: HOLLOWAY, J. E. **The prothallus and young plant of Tmesipteris.** Trans. New Zealand Inst. 50: 1–44. 1917. (See following Entry, 472.)] Plant World 21: 241–243. 1918.—Reviewer summarizes author's results and regards the paper as a very valuable one. Criticizes adversely the illustrations and the use of "loose" terminology.—*E. W. Sinnott.*

472. HOLLOWAY, J. E. **The prothallus and young plant of Tmesipteris.** Trans. New Zealand Inst. 50: 1–44. *Pl. 1–3.* 1917.—Author states that *Tmesipteris* occurs commonly throughout New Zealand as an epiphyte on stems of tree ferns and other forest trees, and where rainfall is very heavy, in heaps of humus on the ground at bases of trees. His young plants were secured in the latter situation. Series of prothallia found by him measure from 1 to 18 mm. in length. The unbranched forms are carrot-shaped, tapering down from a fairly thick head. Sooner or later the head of the prothallium forks dichotomously. Archegonia and antheridia are borne over the entire surface of the prothallium. Some space is given to a description of the anatomy, embryology and development of the sporophyte. Author concludes that *Tmesipteris* exhibits so little resemblance to any other class of Pteridophyta, living or extinct, that its phylogenetic position remains a matter of uncertain speculation. [See preceding Entry, 471.]—*J. H. Faull.*

473. THOMPSON, J. M. **The anatomy and affinity of Stromatopteris moniliformis Mett.** Trans. Roy. Soc. Edinburgh 52^1: 133–156. *Pl. 1–4.* 1918.—Paper based on two incomplete herbarium specimens and a fertile leaf. Author concludes that *Stromatopteris* ranks with the Gleichenias, but is a xerophytically reduced type.—*J. H. Faull.*

474. THOMPSON, J. M. **A further contribution to the knowledge of Platyzoma microphyllum R. Br.** Trans. Roy. Soc. Edinburgh 52^1: 157–165. 1918.—Three types of spores are found on pinnae of *Platyzoma microphyllum.* Majority of sporangia are small and contain about 32 small spores each. Remaining sporangia are large and contain about 16 large spores each. Spores of intermediate size are developed when spore output in any sporangium is greatly decreased. Markings in all 3 types of spores are similar. Author favors view that *Platyzoma* is truly heterosporous, but has not yet effected a demonstration.—*J. H. Faull.*

SPERMATOPHYTES

475. ANONYMOUS. **Tetramerous flowers of Narcissus.** Jour. Roy. Hort. Soc. 43: 34. 1918.—Two specimens from different sources showed in each case eight perianth parts, eight stamens, and four carpels. The tetramerous condition seems not be to rare in *Narcissus* and nearly allied forms.—*C. E. Allen.*

476. BOWLES, E. A. **Two-flowered snowdrop.** Jour. Roy. Hort. Soc. 43: 31. 1918.—A plant of *Galanthus Elwesii* showed the usual two foliage leaves from the soil, the flowering

stem bore a third leaf about three inches above the soil, in the axis of which was a second flower. It appears that the axis of the bulb had elongated, carrying the flowering stem up above ground.—*C. E. Allen.*

477. DAHLGREN, K. V. O. **Die jungeren Entwicklungsstadien der Samenanlagen von Typha latifolia L. [Early stages of seed-formation in Typha latifolia.]** Svensk Bot. Tidskr. 12: 207–211. *8 fig.* 1918.—The formation of the embryo-sac is not of the *Lilium* type, but the macrosopre mother-cell gives rise to 4 macrospores, 3 of which break down. Occasionally two macrospore mother-cells are present and each produces an 8-celled embryo-sac. The primary archesporial cell divides to form the macrospore mother-cell and a cover cell, which divides to form part of the nucellus. The epidermal tissue of the nucellus is found to be composed of two cell layers.—*C. H. Farr.*

478. EKSTRAND, HARRY. **Zur Zytologie und Embryologie der Gattung Plantago. [Cytology and embryology of Plantago.]** Svensk Bot. Tidskr. 12: 202–206. *7 fig.* 1918.—In one individual of *Plantago major* there were a few diakinetic stages found in which only part of the chromosomes are paired. The unpaired ones do not lie in the equator of the metaphase spindle, do not divide, and are unequally distributed to the daughter nuclei. There result pollen grains of various sizes, the smaller of which do not last long. In another individual all reduction division stages were normal. An occasional anomalous unfertilized embryo-sac is found, such as one with 16 nuclei, or 7 nuclei, or with two large and many small nuclei. Some of these are fertilized, but their subsequent history is unknown.—*C. H. Farr.*

479. GRIER, N. M. **Double flowers in Hemerocallis fulva Linn.** Torreya 18: 242. 1918. —Six specimens of double flowers in this species were collected at Kirkwood, Missouri. The plant bearing these flowers was apparently typical and there was no indication of insect injury in connection with the flowers. The flowers show a perianth of 12 distinct alternating segments; 12 stamens, some of which may be abortive; 2 styles, united and frequently abortive into a claw-shaped body; ovules minute. It is suggested that the term *diplous* be applied to such flowers.—*Margaret C. Ferguson.*

480. HAZEN, T. E. **The trimorphism and insect visitors of Pontederia.** Mem. Torrey Bot. Club. 17: 459–484. *2 pl., 12 fig.* 1918.—A summary of previous work on trimorphism in this and related genera is given, and a morphological study of the flower is presented from the standpoints of trimorphism and adaptability to insect visitors. There is also a discussion of cross pollination between the three types of flowers, accompanied by diagrams. Among insect visitors, species of Lepidoptera, Hymenoptera and Diptera are listed. [See Bot. Absts. 1, Entry 830.]—*V. A. Pease.*

481. JAUCH, BERTHE. **Quelques points de l'anatomie et de la biologie des Polygalacées. [On the anatomy and biology of the Polygalaceae.]** Bull. Soc. Bot. Genève 10: 47–84. *15 fig.* 1918.—The author concludes that the genus *Xanthophyllum* is not to be separated as a distinct family from the Polygalaceae, as Gagnepain has maintained; in spite of its regular flowers and of other differences of generic importance, its close relationship with the Polygalaceae is shown by the relation of its floral parts and by the form of its pollen. A detailed study was made of the floral structures of *Polygala Chamaebuxus*, with which were compared those of other species of the same section, particularly *P. venenosa*. and of one species of *Securidaca*. Mention is also made of various points noted in the study of other species of *Polygala*. Experiments show that the flowers of *Polygala Chamaebuxus* are self-sterile; those of *P. vulgaris*, on the contrary, are self-fertile. Descriptions are given of the course of the vascular bundles in the flower, the development and dehiscence of the anther, and the structure of the pistil in *P. Chamaebuxus*. Some or occasionally all of the anthers of a flower may be sterile, as a result of a breaking down of the sporogenous cells in a manner analogous to that normally characteristic of the cells of the tapetum. The bicarpellate ovary contains two cavities separated by a thin partition; on each side of this partition is a single ovule.

The placentation is thus apparently axile but in reality parietal, as is shown by the innervation of the ovules. This is found to be true also in the other species examined. The macrospore mother cell divides to form three cells, of which the innermost develops into an embryo sac of typical form. The polar nuclei unite shortly before fertilization. In the more primitive members of the family the anther has four loculi; types of anthers with three or two loculi, found in various species, are the result of a reduction from the original type. The nectarial disk (when this is not reduced to a small gland without vascular tissue, as it is in *Polygala Chamaebuxus*) is innervated from the androecium. Lysigenous glands, found numerously in the leaves and various parts of the flowers of certain American species, suggest a relationship between this family and the Terebinthinaceae (Burseraceae).—*C. E. Allen.*

482. RATCLIFF, H. W. **Double-spathed Richardia.** Jour. Roy. Hort. Soc. 43: 31. 1918. —The development of an extra spathe is not very uncommon in some species of *Richardia*. An example of this kind in *R. africana* showed slight green markings on the second, lower spathe.—*C. E. Allen.*

483. SHAW, W. R. **Some microtechnical methods and devices.** Philippine Jour. Sci. Bot. 13: 241–261. *Fig. 5.* 1918.—As a result of several years of teaching, and of collecting and preparing materials, the author has developed modifications of methods laid down in the various laboratory handbooks, and presents several ingenious ways of using microscope; equipment so as to avoid multiplication of accessory parts, and hence to keep down the expense of laboratory equipment. He discusses ocular micrometers used as stage micrometers; the square-ruled micrometer used as a position indicator, and also for drawing to scale; the use of capillary glass rods for cover-glass supports, and methods for making autographic records on micrographic slides, and for recording magnification on micrographic negatives. Of special interest to those working with plankton, and with relatively large objects mounted entire, are his methods developed during a study of the Volvocaceae of the vicinity of Manila. Hastening the concentration of glycerine by means of the vacuum pump, a method for making sealed glycerine mounts of the larger Volvocaceae, and an adaptation of the Osterhout method for rapid mounting of large objects in water media are discussed; a new form of plankton net is described; two washing devices for small objects are figured and described, and methods of estimating the number of cells in spherical surfaces are given. [See Bot. Absts. 2, Entry 332.]—*V. A. Pease.*

484. SOUÈGES, R. **Embryogenie des Liliacées. Developpement de l'embryon chez l'Anthericum ramosum. [Embryogeny of Liliaceae. Embryo development in Anthericum ramosum.]** Compt. Rend. Acad. Sci. Paris 167: 34–36. 1918.—The early stages in development of the embryo of *Anthericum* are here traced, and compared with the corresponding stage in *Sagittaria* and *Myosurus*. The conclusion is reached that the embryogeny of monocotyledons and dicotyledons is fundamentally the same, although presenting differences which suggest the possibility of establishing relationships among the families of the two great groups. —*M. A. Chrysler.*

485. TACKHOLM, G., AND E. SÖDERBERG. **Neue Beispiele der simultanen und sukzessiven Wandbildung in den Pollen-mutterzellen. [New examples of simultaneous and successive wall-formation in pollen-mother-cells.]** Svensk. Bot. Tidsk. 12: 189–201. *9 fig.* 1918.—The pollen-mother-cells of *Aristolochia fimbriata* undergo successive bipartition by cell plate but those of *A. Sipho* divide by quadripartition. In the latter there is found to be a slight thickening of the spindle fibers after the heterotypic nuclear division but no cell plate or wall is produced. After the homoeotypic nuclear division, walls are laid down as fine plates at the equator of the several spindles. The microspores are usually in a perfect tetrahedral arrangment, whereas in *A. fimbriata* there are none so oriented. In *Asarum europaeum*, however, which is characterized by quadripartition, there are some perfect tetrads and some of other forms. In *Vinca rosea* the microspores are for the most part arranged in perfect tetrads. It is therefore concluded that the mother-cell must divide by quadripartition, although Frye

and Blodgett found a few tetrads in the related genus *Apocynum* in which there was only bipartition of the mother cells. In *Albizzia lophanta* the mother-cell undergoes two somatic divisions, forming a group of 4 cells. The nucleus of each of these then passes through the heterotypic and homoeotypic mitoses successively and the cell is finally divided by quadripartition. This latter process is said to take place by the formation of partitions as equatorial plates in the spindles. Quadripartition is reported for 3 other species of dicotyledons: *Epimedium niveum*, *Piper subpeltatum*, and *Saururus cernuus*. It was also found in one monocotyledon, *Dioscorea quinquefolia*, where it takes place by means of equatorial plates on the spindles. Six other monocotyledons were found to have bipartition. In *Canna*, tetrads were found, but it is not held that this is strong evidence of a previous quadripartition.—The 9 text figures show interkinetic, mitotic and tetranuclear stages, respectively, but none are given of cytokinesis. The authors apply the occurrence of the two types of division to the systematic classification of angiosperms.—*C. H. Farr.*

486. Vischer, W. **Sur une monstruosité syncaulome du Taraxacum officinale Weber. [Syncauly in Taraxacum officinale.]** Bull. Soc. Bot. Genève 10: 21–25. *2 fig.* 1918.—In the case described, a hollow cylinder 2–3 cm. in diameter bears at the top 7 or 8 heads, some clearly distinct, others confluent; within the cylinder are 12 free stalks bearing normal heads and some leaves. In the cylinder are two concentric series of bundles, of which those in the outer series are normally oriented, but those of the inner series have their phloem turned toward the center of the cylinder. The author concludes that the case in question is one of connection or coherence, rather than of fasciation strictly speaking. Fasciation proper results from the replacement of a growing *point* by a growing *line*, produced (according to Church and Worsdell) by a repeated dichotomy. In the present case there seems to have been a union of growing points originally separate, their number not increasing toward the apex.—*C. E. Allen.*

487. Worsdell, W. C. **Stipules of hawthorn.** Jour. Roy. Hort. Soc. 43: 29. 1918.—Leaves of *Crataegus sinaica* show transitions between leaf segments and so-called "stipules," demonstrating that the latter are parts of the lamina, and not true stipules.—*C. E. Allen.*

488. Worsdell, W. C. **Many-flowered tulips.** Jour. Roy. Hort. Soc. 43: 35. 1918.—Branched tulips are common, especially among Darwin varieties in many gardens. The many-flowered condition arises from adnation of branches, not from fasciation. Branching occurs in *Tulipa biflora*, *T. saxatilis* and *T. praestans.*—*C. E. Allen.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

489. Berry, Edward W. **Pleistocene plants from Tennessee and Mississippi.** Torreya 19: 8–10. Jan., 1919.—Records *Osmunda* sp., *Quercus predigitata* Berry and *Castanea pumila* Mill. from the Pleistocene at Adamsville, McNairy County, Tennessee; and nutlets of *Celtis mississippiensis* Bosc. from the Loess at Vicksburg, Mississippi, the last not heretofore known in the fossil state.—*E. W. Berry.*

490. Berry, Edward W. **The age of the Brandon lignite and flora.** Amer. Jour. Sci. 47: 211–216. Mar., 1919.—Discusses the fossil flora from this classic locality in Vermont, and from a consideration of the floral evidence and the indicated climatic conditions at the time of the deposit of the Brandon lignite as compared with other deposits of known age, concludes that the Brandon lignite and its contained flora could not be Miocene in age as many students have supposed, but belongs in the earlier half of the Tertiary period (Eocene).—*E. W. Berry.*

491. Howe, M. A. **On some fossil and recent Lithothamnieae of the Panama Canal Zone.** U. S. National Mus. Bull. 103: 1–13. *pl. 1–11.* 1918 (1919).—Describes the following new

species: *Archaeolithothamnium episporum* from the Pleistocene and Recent, *Lithothamnium vaughanii* from the Oligocene Culebra formation, *Lithothamnium isthmi* from the Oligocene Emperador limestone, and records *Lithoporella melobesioides* Foslie from the Oligocene Emperador limestone.—*E. W. Berry.*

492. Pollock, James B. **Blue-green algae as agents in the deposition of marl in Michigan lakes.** Michigan Acad. Sci. 20: 247–260. *Pl. 16–17.* 1918.—See Bot. Absts. 2, Entries 555, 623.

493. Trelease, Wm. **The ancient oaks of America.** Mem. Brooklyn Bot. Gard. 1: 492–501. July 6, 1918.—Exclusive of those now referred to the family prototype, *Dryophyllum*, or believed to represent genera not comprised in the Fagaceae, the nominal North American fossil oaks number about 150, or somewhat less than half as many as the species now living. Of these about one-third pertain to each of three geologic period,—48 for the Cretaceous, 56 for the Eocene, and 42 for the Miocene. Little is known of Pliocene oaks, but four North American and four Brazilian species have been described. From Pleistocene or glacial deposits, 20 are known. These are essentially identical with oaks now living in the regions where the fossils have been found; the Pliocene oaks are also of modern types, but as yet less clearly identifiable with living species. None of the earlier fossils is believed to have survived from one geologic period to another.—For convenience of comparison, the Cretaceous and Tertiary oaks have been arranged on their leaf-form into 14 general groups. Of these, one with oleander-like leaves, one with ash-like foliage, two with alder-like foliage and one with birch or haw-like leaves, are found scarcely comparable with existing oaks if, indeed, they pertain to *Quercus*. A bayberry-like type and one with small trilobed leaves are equally questionable. One group with magnolia-like foliage and two with chestnut-like leaves suggest certain groups that are living now; and two groups, respectively with lobed and pungently toothed leaves, are even more suggestive of existing oaks.—The collective impression made by these ancient American oaks is that in the several geologic ages they have re-evolved a multiplicity of comparable foliage forms from a single initial and that this has been of the semi-xerophytic small holly-like type; but that no traciable ancestry of existing species is to be looked for earlier than very late Tertiary time. In one Tertiary oak (*Q. Palaeo-ilex*) Ettingshausen finds a fore-shadowing of all existing foliage types; but the species of America are believed by the writer to have developed independently of those now growing in Europe and Asia, probably assuming their present specific characters toward the end of Tertiary time. —*Wm. Trelease.*

PATHOLOGY

Donald Reddick, *Editor*

494. Agrellius, F. U. G. **Data concerning the dissemination of wheat rust Puccinia graminis Pers.** Trans. Kansas Acad. Sci. 28: 115–117. 1916–17.—The possibility of epiphytotics of stem rust of wheat being due to the rust carrying over on grasses is presented. The names of a few grasses bearing rust as they appear in Kansas are named, but the species of rust is not identified. No examination was made morphologically or physiologically of these rusts.—*L. E. Melchers.*

495. Bancroft, C. K. **Diseases in plants with special reference to fungi parasitic on crops in British Guiana.** Jour. Board. Agric. British Guiana 11: 47–57. 1918.—A brief review is given of the nature and causes of diseases in plants. Methods for preparing and applying different fungicides are described. The following list of fungi which cause diseases in British Guiana is given. Sugar cane: *Marasmius sacchari*, *Leptosphaeria sacchari*, *Melanconium sacchari*, *Thielaviopsis paradoxa*, *Colletotrichum falcatum*, *Cercospora vaginae*; rice: *Piricularia oryzae*, *Tilletia horrida*, *Sclerotium oryzae*; cocoanut: *Bacillus* sp, *Pestalozzia palmarum*; cacao: *Marasmius perniciosus*, *Phytophthora faberi*, *Thyridaria tarda*, *Nectria bainii*, *Cor-*

ticium salmonicolor; coffee: *Sclerotium* sp., *Stilbum nanum, Hymenochaete noxia, Colletotrichum coffeae, Sphaerostilbe flavida*; lime: *Sphaeropsis tumefaciens, Fusarium limonis, Hymenochaete noxia, Loranthus theobromae, Capnodium citricolum, Colletotrichum gloeosporioides*; orange: *Penicillium olivaceum, Fusarium limonis*; Para rubber: *Melanopsammopsis ulei, Fomes semitostus, Hymenochaete noxia, Thyridaria tarda*; mango: *Gloeosporium mangiferae, Dimerosporium mangiferae*; bread fruit: *Gloeosporium mangiferae*; banana: *Bacillus* sp. *Ustilaginoidella oedipègera, Gloeosporium musarum*; maize: *Ustilago maydis*; cotton: *Colletotrichum gossypii, Bacillus gossypinus*; sisal: *Colletotrichum agaves*; grape: *Uncinula spiralis, Penicillium glaucum, Guignardia bidwellii*; papaw: *Pucciniopsis caricae*; tomato: *Bacillus solanacearum;* pepper: *Colletotrichum nigrum*; ground nut: *Cercospora personata*; cassava: *Cercospora cearae*; pineapple: *Penicillium* sp., *Thielaviopsis paradoxa.—J. B. Rorer.*

496. Bancroft, C. K. **The mango and bread fruit disease.** Jour. Board Agric. British Guiana 11: 75. 1918.—This disease caused by *Gloeosporium mangiferae* has caused an enormous loss of fruit during the past six months. The disease may occur on fruit of all ages and makes it unfit for consumption. Two sprayings with bordeaux mixture are sufficient to control the disease; the first should be made when the fruit is set and the second, three or four weeks later.—*J. B. Rorer.*

497. Barrett, J. T. **Bacterial gummosis of apricots.** Preliminary report. Monthly Bull. State Comm. Hort. [California] 7: 137–140. *Fig. 15–18.* 1918.—The disease is similar if not identical with gummosis of stone fruits described by Barss and others in Oregon. Inoculations with pure cultures of bacteria from cankers gave infection. Preliminary experiments with the surgical methods employed for control of pear blight give indications of success. The disease may prove as serious for apricots in California as blight (*Bacillus amylovorus*) is for pears.—*D. Reddick.*

498. Barss, H. P. **Bacterial gummosis of stone fruits.** Monthly Bull. State Comm. Hort. [California] 7: 121–136. *Fig. 4–14.* 1918.—Nature, cause and control of gummosis caused by *Pseudomonas cerasi*, based largely on previously reported work by the author.—*D. Reddick.*

499. Beach, Walter S. **The Fusarium wilt of China aster.**—Rept. Michigan Acad. Sci. 20: 281–308. 1918.—See Bot. Absts. 2, Entry 624.

500. Bisby, G. R. **A Fusarium disease of garden peas in Minnesota.** (Abstract.) Phytopath. 8: 77. 1918.—A species of *Fusarium* has been proved pathogenic. It attacks the germinating seed and also causes wilt of plants by attacking roots and stem.—*D. Reddick.*

501. Brandes, E. W. **Banana wilt (Panama disease).** Porto Rico Agric. Exp. Sta. Rept. 1916: 29–31. *Pl. 4–5.* 1918.—Proof of the pathogenicity of *Fusarium cubense* for banana and a technical description of the organism.—*D. Reddick.*

502. Bryce, P. I. **Injurious fungi of Ste. Anne de Bellevue. 1917.** Ann. Rept. Quebec Soc. Prot. Plants 10: 49–51. 1918.—The following diseases are mentioned as injurious: apple: black rot and canker, scab; bean: blight and anthracnose; corn: smut; currant: leaf spot or anthracnose, rust; hollyhock: rust; pear: scab; plum: shothole, brown rot; potato: early blight and especially late blight; tomato: blossom end rot and Septoria leaf-spot.—A table is included which shows the mean temperature and precipitation for the growing season of 1917 as compared with the previous ten-year average.—Sclerotia of *Claviceps purpurea* were germinated abundantly without the action of frost.—*D. Reddick.*

503. Burt, Edward Angus. **Corticiums causing Pellicularia disease of the coffee plant, hypochnose of pomaceous fruits, and Rhizoctonia disease.** Ann. Missouri Bot. Gard. 5: 119–132. *Fig. 1–3.* 1918.—See Bot. Abst. 1, Entry 395.

504. COOK, MELVILLE, T. **Report of the Department of Plant Pathology** Ann. Rept. New Jersey Agric. Exp. Sta. 1916: 561–625. 1918.—This publication takes up climatic condition of the year, epidemics of diseases and a list of the most common diseases of the year. It also includes papers by W. H. Martin, by W. S. Krout and by H. Clay Lint.—*M. T. Cook.*

505. COOK, MELVILLE, T. **Report of the Department of Plant Pathology.** Ann. Rept. New Jersey Agric. Exp. Sta. 1917: 523–563. 1918.—This publication outlines the investigations in progress, epidemics of diseases, plant disease survey and a list of the common diseases of the year. It also includes papers by R. F. Poole, by W. H. Martin and by Mel. T. Cook.—*M. T. Cook.*

506. COONS, G. H. **Michigan potato diseases.** Michigan Agric. Exp. Sta. Special Bull. 85. *49 p., 41 fig.* 1918.—Popular descriptions with illustrations and notes on the distribution in Michigan of the following diseases: late blight (*Phytophthora*), early blight (*Alternaria solani*), tip burn, scab (*Actinomyces chromogenus*), black scurf (*Rhizoctonia*), wilt (*Fusarium*), black leg (*Bacillus atrosepticus*), curly dwarf, leaf roll, mosaic, dry rots (caused by *Fusarium* spp., also *Armillaria mellea*). Various tuber troubles, hollow heart, frost injury, internal brown spot, etc. are described. Methods of controlling the diseases are stated.—*D. Reddick.*

507. DEMANDT, ERNST. **Untersuchungen über Kanker und Braunfäule am samoanischen Kakao. [Investigation of canker and brown rot of Samoan cacoa.]** Zeitschr. Pflanzenkr. 28: 241–291. 1918.—In 1904 a canker disease of cacao made its appearance in the rather extensive plantations in Samoa. The disease was not thought at first to be contagious. A commission appointed by the government, attributed it to poor soil. By 1909 the canker had spread over large areas causing great damage and killing thousands of trees. About this time another disease referred to as brown rot, made its appearance. This rot attacked the cacao fruits. In order to determine the nature of these two diseases which threatened cacao culture in Samoa, the government obtained the services of Dr. Gehrmann a plant pathologist. Gehrmann studied both diseases and came to the conclusion that canker was caused by a *Fusarium* which he designated *Fusarium samoense* n. sp. He reported brown rot as due to *Phytophthora* sp. Both canker and brown rot occur in other cacao producing countries such as Ceylon, Java and Trinidad. All workers have agreed that brown rot is caused by *Phytophthora faberi* Maubl. but there is disagreement among them as to the cause of the canker. The author after careful study and infection experiments concludes that both brown rot and canker are caused by *Phytophthora faberi.* He finds *Fusarium samoense* closely associated with *Phytophthora* in the cankers but shows that it is a saprophyte. *Phytophthora faberi* attacks fruits and stems of *Hevea brasiliensis,* which is sometimes planted along with cacao. The author gives the results of experiments on the cacao diseases and a summary of the methods by which they may be held in check.—*L. O. Kunkel.*

508. DODGE, B. O., AND J. L. ADAMS. **Some observations on the development of Peridermium cerebrum.** Mem. Torrey Bot. Club 17: 253–261. *Pl. 4–6, 3 fig.* 1918.—A description of the galls produced by *Peridermium cerebrum* on *Pinus rigida* growing in the pine barrens of New Jersey and on *P. virginiana* in Virginia. It is thought that infection usually takes place when the trees are from one to four years old. The fungus often spreads peripherally from the point of infection by a series of sudden localized migrations and stimulates the production of several galls in the same canker, the center gall being the oldest.—The spermatia are produced on spermatiophores which form practically a continuous layer over the gall. The origin and the development of aecia are discussed in some detail. No instance has been found where spermagonia and aecia are following each other on the same area of the same gall, however both may develop on different parts of the same gall. Observations seem to indicate that there is an alternation of aecia and spermagonia as previously reported by other workers. Successful infection experiments have been made on the following species of oak: *Quercus illicifolia, Q. marylandica,* and *Q. heterophylla.* [See Bot. Absts. 2, Entry 282.]—*J. L. Weimer.*

509. Doidge, E. M. **Potato diseases. VII.—Late blight (Phytophthora infestans de Bary).** S. African Fruit Grower 5^3: 47. 1918.

510. Doidge, E. M. **Walnut blight (Bacterium juglandis Pierce).** S. African Fruit Grower 5^4: 68. 1918.

511. Doidge, E. M. **Potato diseases, VIII. Internal brown fleck.** S. African Fruit Grower 5^5: 94. 1918.

512. Elliott, J. A. **Arkansas peach diseases.** Arkansas Agric. Exp. Sta. Bull. 149. *9 p., 5 pl.* 1918.—Brief descriptions and illustrations of the following diseases with notes on their prevalence, destructiveness and control in Arkansas: Brown rot (*Sclerotinia cinerea*), black spot (*Bacterium pruni*), scab (*Cladosporium carpophilum*), leaf curl (*Exoascus deformans*), crown gall (*B. tumefaciens*), die back (*Valsa leucostoma*), root rot (*Armillaria mellea*), wood rots (*Coriolus versicolor, Pycnoporus cinnabarinus* and *Schizophyllum commune*).—*D Reddick.*

513. Giles, P. L., and J. O. Carrero. **Chlorosis of sugar cane.** Porto Rico Agric. Exp. Sta. Rept. 1917: 10–20. 1918.—In extreme cases the leaves are of normal size but creamy white in color; in mild cases the veins are green thus giving the leaf a striated appearance.—The trouble occurs in numerous restricted areas in southern part of island, the areas ranging in size from a few square feet to an acre. Chlorosis may appear at any stage of growth from two months after planting up to the time of arrowing.—Analyses of soil were made from a large number of fields of healthy and of diseased cane to determine whether chlorosis is associated with an excessive amount of carbonate of lime. "While chloritic cane was found only on markedly calcareous soils, all calcareous soils did not produce chlorotic cane."—Analyses of ash of green and chloritic leaves shows that the only consistent difference is a reduced amount of iron in chlorotic leaves.—Painting leaves of chlorotic plants with 0.5 per cent solution of ferrous sulfate caused them to turn green; dusting them with powdered sulfate had no effect. Spraying with sulfate of iron is impracticable as a means of control because of the necessity of frequent applications.—Field experiments were performed which "show that the chlorosis is ameliorated to some extent by the application of stable manure containing ferrous sulfate and stable manure alone, but small applications of these materials produced only slight improvement and larger applications, though more effective, by no means overcame the chlorosis completely."—*D. Reddick.*

514. Gray, Geo. P. **The consumption and cost of the economic poisons in California, 1916.** Monthly Bull. State Hort. Comm. [California] 7: 140–144. 1918.—Estimates for the various materials are based on figures furnished by County Horticultural Commissioners in 28 counties representing 70 per cent of the acreage of fruit in the state. Total estimated expenditure for poisons (fungicides, insecticides, etc.) $2,468,000.—*D. Reddick.*

515. Gray, Geo. P. **Wettable sulfurs.** Monthly Bull. State Hort. Comm. [California] 7: 191–192. 1918.—Use of powdered glue, 1.5 ounces, and hot water, 3 gallons, for 10 pounds of powdered sulfur.—*D. Reddick.*

516. Hodgson, Robert W. **Black smut of figs.** Monthly Bull. State Comm. Hort. [California] 7: 188–189. 1918.—See Bot. Abst. 1, Entry 618.

517. Hodgson, Robert W. **Little leaf of deciduous fruits.** Monthly Bull. State Comm. Hort. [California] 7: 529–532. 1918.—The disease occurs to a certain extent in all parts of California but is more common in trees grown in light, sandy soil. Evidence is presented tending to support the theory that the trouble is due to drought.—*D. Reddick.*

518. Hodgson, Robert W. **Citrus blast.** Quart. Bull. State Plant Bd. Florida 2: 123–130. *Pl. 3–4, fig. 77.* 1918.—Description of the disease, caused by *Bacterium citrarefaciens*, as it occurs in California.—*D. Reddick.*

519. Harland, S. C. **Tomato breeding in St. Vincent.** Agric. News Barbados 17: 10. 1918.—Describes crosses made between the St. Vincent native tomato and Ponderosa. In the F_1 generation some plants were immune to the Blossom End Rot, a disease to which Ponderosa is very susceptible in St. Vincent. The St. Vincent native tomato is immune to this disease. Some plants of this generation showed a greater power of resistance to *Bacterium solanacearum* than others.—*J. B. Rorer.*

520. Hughes, H. D. **Improved method of fighting smut in oats.** Iowa Agric. Exp. Sta. Circ. 45. *8 p., illust.* 1918.—The atomizer method of treatment described. One pint of formaldehyde diluted with 1 pint of water is sufficient for 50 bushels of seed.—Iowa oat fields showed an average of 7.5 per cent of smut in 1912–1913.—Variety Early Champion is more susceptible to smut than others and in general early varieties are more susceptible than late ones.—*D. Reddick.*

521. Jehle, R. A. **Effect of disinfectants upon Bacterium citri.** Quart. Bull. State Plant Bd. Florida 2: 112–123. *2 pl.* 1918.—An exhaustive test to determine the maximum time required, by certain disinfectants, to kill the organism. Technique employed is fully described. The following substances were tested and in the concentrations indicated: mercuric chlorid 1:500, 1:1000, 1:1500, 1:2000, 1:2500, 1:3000; chlorazene, 1:250, 1:500, 1:1000, 1:1500, 1:2000; trikresol, 0.5, 1.2 and 3 per cent solutions; lysol, 0.5, 1.2 and 3 per cent solutions; creolin (Pearson), 1:50, 1:75, 1:100; carbolic acid, 0.8, 1, 2, 3, 4 and 5 per cent solutions; formaldehyde, numerous concentrations from 0.8 to 3.2 per cent solutions; kreso, zenolium, carbolinium and maldezone in several dilutions; copper sulphate, 2 to 8 per cent solutions.—Since pruning tools and the like when dipped into a solution usually become dry within one minute, the following minimum concentrations of germicides should be used for disinfection purposes: mercuric chlorid 1:1500; chlorazene, 1:250; trikresol, lysol and creolin, 1 per cent solution; formaldehyde 3.2 per cent (8 per cent commercial), kreso, 1:40; carbolinium, full strength.—The addition of "red soil," 10 per cent by weight, to solutions of mercuric chlorid did not decrease the germicidal action.—*B. citri* was killed in mercuric chlorid, 1:1500, at 80°F. in thirty seconds and at 44° F. in forty seconds.—*D. Reddick.*

522. Johnston, J. R. **Diseases of sugar-cane in tropical and sub-tropical America, especially the West Indies.** (With notes by S. F. Ashby, C. K. Bancroft, W. Nowell, and J. A. Stevenson.) West Indian Bull. 16: 275–308. *7 pl.* 1918.—The history and exact descriptions of the following diseases and fungi are given; the gumming disease (*Bacterium vascularum*), humid gangrene, stem-rot or Iliau (*Gnomonia iliau*), red leaf spot (*Eriosphaeria sacchari*), smut (*Ustilago sacchari*) thread blight (*Hypochnus sacchari*), root disease (*Marasmius sacchari* and *M. stenophyllus*), red rot (*Colletotrichum falcatum*), rind fungus (*Melanconium sacchari*), wilt (*Cephalosporium sacchari*), pineapple disease (*Thielaviopsis paradoxa*), brown leaf spot (*Cercospora longipes*), red spot of leaf sheath (*Cercospora vaginae*), yellow leaf spot (*Cercospora kopkei*), eye leaf spot (*Helminthosporium sacchari*), red rot of leaf sheath (*Sclerotium rolfsii*), *Trichosphaeria sacchari*, *Sphaerella sacchari*, *Leptosphaeria sacchari*, *Thyridaria tarda*, *Nectria laurentiana*, *Odontia saccharicola*, *O. sacchari*, *Scizophyllum commune*, *Laternea columnata*, *Cytospora sacchari*, *Coniothyrium melasporum*, *Darluca melaspora*, *Diplodia cacaoicola*, *Melanconium saccharinum*, and *Himantia stellifera*. Yellow stripe, top rot, sereh, mottling disease, wither tip and chlorosis, the causes of which are unknown or nonparasitic, are also described. The author deals principally with the diseases as they occur in Cuba and Porto Rico; their prevalence and importance in Jamaica, British Guiana, Barbados and Porto Rico are discussed in the notes.—The root disease caused by *Marasmius sacchari* is by far the most destructive in the area dealt with. Nomenclature of *Melanconium sacchari* is thoroughly discussed and it is stated that there is no connection between this fungus and *Trichosphaeria sacchari*.—As control measures are recommended selection of healthy and where possible resistant seed, disinfection of seed, rotation of crops, reduction of injury or wounds in standing canes and cutting cane before it becomes overripe.

A bibliography of 39 titles is given. The majority of the illustrations have been copied from previous papers.—*J. B. Rorer.*

523. Kezer, Alvin, and Walter G. Sackett. **Beans in Colorado and their diseases.** Colorado Agric. Exp. Sta. Bull. 234. *32 p., illust.* 1918.—Bean streak is described as new. It has the general appearance of blight and the same organs are affected. The cause is not known.—Bacteriosis (*Ps. phaseoli*) is the commonest and most destructive disease. Anthracnose (*C. lindemuthianum*) and rust (*U. appendiculatus*) are of little consequence.—*D. Reddick.*

524. Lemée, E. **Dégats causés dans les jardins de la region d'Alençon par les principaux ennemis des plantes potagères et des arbres fruitiers. (Printemps-été 1917). [Damage caused in Alençon by the principal enemies of garden plants and fruit trees.]** Jour. Soc. Nation. Hort. France 19: 42–48, 61–64, 74–76. 1918.

525. McCubbin, W. A. **Tomato diseases.** Dominion Exp. Farm [Canada] Bull. 35. *16 p., 8 fig.* 1918.—Diseases common on tomatoes in southern Ontario are described and control methods given. A key based on readily recognized features is supplied.—*W. A. McCubbin.*

526. Melhus, I. E., and I. H. Vogel. **Cabbage diseases.** Iowa Agric. Exp. Sta. Circ. 46. *4 p., 3 fig.* 1918.—Popular description of blackleg, blackrot, club root and yellows with methods of control for Iowa conditions.—*D. Reddick.*

527. Miller, C. C. **Treatment of gummosis with carbolineum.** Monthly Bull. State Comm. Hort. [California] 7: 488–493. *4 fig.* 1918.—Lemon gummosis caused by *Pythiacystis citrophthora* and by *Botrytis vulgaris.* Scraping out diseased tissue and painting the wound with various substances (including mercuric chlorid and bordeaux paste) gave no better results in 1248 treatments than merely scraping out the cankered area.—Carbolineum (*Avenarius*) painted over the cankered area, on 2700 trees in 1917, and without removing the bark seems to have effected a cure. "Of the 2700 cases not one has been observed to break out again beneath the treated area."—*D. Reddick.*

528. Miller, Carroll C. **Bud curl of the lemon tree.** Monthly Bull. State Comm. Hort. [California] 7: 515–519. *Fig. 70–73.* 1918.—See Bot. Abst. 1, Entry 967.

529. Nowell, W. **Diseases of economic plants.** West Indian Bull. 16: 322–327. 1918.—Report of various diseases affecting the different economic plants of the West Indies during the year 1916. A fungous disease of *Cuscuta* was observed in Grenada which seemed to effect a useful measure of control.—*J. B. Rorer.*

530. Nowell, W. **Eel-worm disease (blackhead) of bananas.** Agric. News Barbados 17: 206. 1918.—The disease occurs in Grenada on the coarse banana known as bluggoe. The presence of the disease is most evident in plants that are reaching the bearing age. The outer leaves and partially developed bunch of fruit frequently dry up, the general appearance being that the plants lack water and nourishment. The whole root system is dead and the adjacent parts of the bulb are black and disorganized. No fungi or bacteria were uniformly present in the diseased tissues. Nematodes were regularly present and their eggs were found in the least altered and deepest seated of the discolored tissues, and in some cases the worms themselves were seen occupying the cells of undecayed tissue close to the central cylinder of the roots. The disease is probably the same as that of Jamaica and Fiji.—*J. B. Rorer.*

531. Orton, W. A. **Breeding for disease resistance in plants.** Amer. Jour. Bot. 5: 279–283. 1918.—See Bot. Abst. 1, Entry 235.

532. Oskamp, Joseph. **Winter injury of fruit trees.** Indiana Agric. Exp. Sta. Circ. 87. *12 p., 9 fig.* 1918.

533. Paul, B. H. **White pine blister rust.** New York Conserv. Comm. Bull. 15. *16 p., 6 fig.* (*1 colored*). 1918.—A description of the disease and of *Cronartium ribicola.* Distribu-

tion in New York. "There is already so much blister rust in New York State that it can not be stamped out immediately. But with full coöperation there is a possibility that large areas of our white pine forest land can be protected and the growing of white pine in those areas continued."—There is appended the text of a state law on the control and suppression of white pine blister rust and currant rust and of official quarantine notices.—*D. Reddick.*

534. PAULSEN, F. **A propos du court noue. [About court noue.]** Prog. Agric. et Vitic. 70: 462–466. 1918.—A translation by P. Antoniadis of the author's report of the results of experiments conducted in Palermo and forwarded to the editors of this journal. A letter transmitting these results and containing some brief remarks in regard to them was published in the same volume of this journal, page 75, July, 1918. The results of growing different varieties of grapes on different stocks on infected soil are given. Rupestris du Lot on its own roots became severely affected with the disease. The hybrids of Berlanderi showed at the end of two years a large percentage of diseased plants. The Riparia always gave good results showing little disease even when planted in infected soil. The author believes that the "germs of infection" remain in the soil. In regard to the cause of the disease, however, he says that he believes it to arise spontaneously and to develop and spread as a form of autointoxication produced by possible secretions of poisonous substances which roots of certain varieties seem to absorb —As the disease is believed to remain in the soil for years, infected land should be planted to other crops for several years before planting to vines again. Application of lime, iron-sulphate and other chemicals gave only negative results.—*C. L. Shear.*

535. REIMER, F. C. **A new disinfectant for pear blight.** Monthly Bull. State Comm. Hort. [California] 7: 562–565. 1918.—Healthy trees were wounded and the wounds smeared with a pure culture of *Bacillus amylovorus*. Disinfectants were immediately applied, except on checks, with a brush as follows: bordeaux paste; mercuric chlorid, 1:500; cresol, 5 per cent solution; mercuric cyanide, 1:500; lime-sulfur solution, 10 per cent; chlorozene, 1:500. Blight developed in every case except where mercuric cyanide was used. At 1:1000 this material is not always effective and at 1:300 it causes injury to trees.—The cyanide is not as effective as the chlorid for disinfecting metal tools.—Preliminary trials with formaldehyde (10 per cent commercial) indicate that it may be the best known disinfectant for pear blight work.—*D. Reddick.*

536. SHIRAI, MITSUTARO. **On the development of plant pathology in Japan: A brief historical sketch.** Ann. Phytopath. Soc. Japan 1: 1–4. 1918.—See Bot. Absts. 2, Entry 302.

537. STAKEMAN, E. C., J. H. PARKER, AND F. J. PIEMEISEL. **Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance?** Jour. Agric. Res. 14: 111–124. *6 pl.* 1918.—See Bot. Abst. 1, Entry 500.

538. STEVENSON, JOHN H. **The green muscardine fungus in Porto Rico.** Jour. Dept. Agric. Porto Rico 2: 19–32. *Pl. 1.* 1918.—*Metarrhizium anisopliae* was introduced in Porto Rico in 1911 to aid in the suppression of various injurious insects. "The conclusion seems justified that the green muscardine will not serve as a practical means of controlling the white grubs or May-beetles in Porto Rico." A bibliography of 43 titles is appended.—*D. Reddick.*

539. STEVENSON, JOHN A. **Citrus diseases of Porto Rico.** Jour. Dept. Agric. Porto Rico 2: 43–123. *Fig. 1–23.* 1918.—A compendium of citrus diseases of the island based on four years experience. Introduction contains cultural directions, including practices for grove sanitation and spraying; the appendix contains direction for preparing fungicides and insecticides. The following diseases are described and methods of control are stated when known: damping off; crown rot (*Sclerotium rolfsii*); root rot (usually poor drainage); foot-rot or mal-di-gomma; gummosis (several types); Diplodia canker and dieback, wood rots; pink disease (*Corticium salmonicolor*); dieback or exanthema; withertip (*Colletotrichum*

gloeosporoides); scab [*Cladosporium citri*]; melanose (*Phomopsis citri*); algal leaf spot (*Cephaleuros virescens*); frenching; sooty mold; fruit rots, or shipping rots; and various other minor diseases.—*D. Reddick.*

540. Swingle, D. B., and H. E. Morris. **Crowngall injury in the orchard.** Montana Agric. Exp. Sta. Bull. 121: 121–139. *Fig. 1–6.* 1918.—A record of the behavior of 120 healthy apple trees, 12 each of 10 varieties, and 120 trees showing well developed galls of *Bacterium tumefaciens*. Nursery stock was set in 1910 and records of development kept for eight years. At this time a few galls had disappeared but most of them were growing. Very few new galls developed. No tree had died as a result of the disease and "no very great difference was apparent between the tops of the diseased and of the healthy trees, though a good observer could notice that the healthy ones had made a little better growth. The root systems of the diseased trees, however, were very inferior." The average reduction in circumference of diseased trees as compared with healthy ones was 1.58 inches.—Location of the gall, or hairy root, is of considerable importance, since lateral developments resulted in little injury and girdling galls resulted in pronounced dwarfing. The tree is weakened at the point of attachment of the gall and breaks off easily.—A review of pertinent literature is included.—*D. Reddick.*

541. Tanaka, Tyozaburo. **Notes on some fungous diseases and a new codling moth attacking the persimmon in Japan.** Monthly Bull. State Comm. Hort. [California] 7: 461–463. 1918.—Brief review of 14 papers on persimmon diseases and insects published in Japanese between the years 1905 and 1917.—*D. Reddick.*

542. Taubenhaus, J. J. **Pox, or pit (soil rot), of the sweet potato.** Jour. Agric. Res. 13: 437–450. *Pl. 51–52.* 1918.—The author reviews the past history of this disease and the publications concerning it, and then gives the results of recent investigations by himself and others.—The roots are disfigured and the yields reduced by the presence of the disease. *Cystospora batata* is considered the cause of the disease and not *Acrocystis batatas*. Contact of healthy roots with the active organism is necessary for infection. The disease is said to be equally active in wet and dry weather, but the greatest damage occurs during dry weather. The fungus is believed to be spread by soil adhering to the tools in wet weather, also by water. Rotation of crops tends to decrease the disease and is regarded as the most practical method of controlling the trouble. [See Bot. Absts. 1, Entry 446.]—*C. L. Shear.*

543. Weldon, Geo. P. Pear growing in California. Monthly Bull State Comm. Hort. [California] 7: 219–410. *Fig. 1–185.* 1918.—Chapter 13 (*p. 343–370, fig. 144–164*) is devoted to bacterial and fungous diseases of the pear and methods of control employed in California. Most of the chapter deals with pear blight caused by *Bacillus amylovorus*.—*D. Reddick.*

544. Winberg, O. E. F., G. C. Starcher, and C. L. Isbell. **Report on freeze injury to citrus trees for 1916 and 1917, with notes on orange culture in south Alabama.** Alabama Agric. Exp. Sta. Bull. 199. *26 p., 7 pl.* 1918.

PHYSIOLOGY

B. M. Duggar, *Editor*

GENERAL

545. Stiles, W. **Botany as the science of the living plant.** New Phytol. 17: 251–257. 1918.—A pedagogical article on the teaching of botany, with emphasis on the importance of the physiological aspect.—*S. M. Zeller.*

PROTOPLASM, MOTILITY

546. Schimd, Günther. **Zur Kenntnis der Oscillarienbewegung. [Movement in Oscillaria.]** Flora 11–12: 327–379. 1918.

DIFFUSION, PERMEABILITY

547. Harvey, R. B., and R. H. True. **Root absorption from solutions at minimum concentrations.** Amer. Jour. Bot. 5: 516–521. *Fig. 1–2.* 1918.—The equilibrium of electrolytes in respect to plants grown in water culture was found to depend on the particular plant used, and, when the concentration lay between the toxic limit and the essential limit, it was independent of the salt used, the concentration of the electrolyte, or the volume of the solution. The CO_2 equilibrium of the air, the rate of cleavage of iron-producing compounds, and the reabsorption of the ions determined the electrolyte content at the point of equilibrium.—*R. W. Webb.*

548. Ostwald, Wolfgang. **Zur Theorie der Osmose und Ultrafiltration kolloider Lösungen. [The theory of osmosis and ultrafiltration of colloidal solutions.]** Kolloid-Zeitschr. 23: 68–78. 1918.

549. Renner, O. **Versuche zur Mechanik der Wasserversorgung. [The mechanics of water absorption.]** Ber. Deut. Bot. Ges 36: 172–179. 1918.—Renner answers Nordhausen's criticism (Berichte, 1916) of his earlier work (Flora, 1911) on water movement in plants, and gives a number of experiments to confirm, in the main, his earlier generalizations. He also gives a brief statement on the "saturation deficit" and the "energetics of water movement" in plants.—*William Crocker.*

550. Rippel, August. **Semipermeabel Zellmembranen der Pflanzen. [Semipermeable cell membranes.]** Ber. Deut. Bot. Ges. 36: 202–218. 1918.

WATER RELATIONS

551. Johnston, Earl S. **A simple non-absorbing atmometer mounting.** Plant World 21: 257–260. *Fig. 1.* 1918.—The difficulties attending the filling of non-absorbing atmometers are briefly discussed. A simple modification of the Shive mounting is suggested. This consists in omitting the longer tube extending to the top of the cup and inserting in the shorter tube a tube of slightly smaller diameter drawn down to a capillary tube and bent in the form of a U. The open end of the U just extends into a small quantity of mercury which is placed in the space between the larger and smaller tube. The mercury is prevented from escaping by means of a small piece of rubber tubing fitted around the joint between the two tubes at the place of insertion.—*Henry Schmitz.*

552. Pearson, G. A. **The relation between spring precipitation and height growth of western yellow pine saplings in Arizona.** Jour. Forestry 6: 667–689. *Fig. 1–3.* 1918.—It is found that spring precipitation is the most important of the factors studied in the height growth of this species.—*R. W. Webb.*

MINERAL NUTRIENTS

553. Oijen, L. W. H. van. **Zur Kenntnis der antagonistischen Salzwirkungen. [Antagonistic salt action.]** Biochem. Zeitschr. 87: 418–424. 1918.

554. Plummer, J. K. **Availability of potash in some common soil-forming minerals and effect of lime upon potash absorption by different crops.** Jour. Agric. Res. 14: 297–315. *Pl. 8, Fig. 1–4.* 1918.—Employing pot cultures of oats, soy beans, rye, and cowpeas, which were supplied with potash in the form of biotite, muscovite, orthoclase, microline and potassium sulfate, the author found that the weight of the dry matter produced varied with the source of the potash. Potassium sulfate gave the greatest dry weight, with biotite, muscovite, orthoclase, and microline following in descending order. The effects of lime used in conjunction with the different materials is also noted.—*R. A. McGinty.*

555. Pollock, J. B. **Blue green algae as agents in the deposition of marl in Michigan lakes.** Rept. Michigan Acad. Sci. 20: 247–260. *Pl. 16–17.* 1918.—Marl beds composed largely of concretionary pebbles are deposited in association with several Cyanophyceae and may be deposited in the total absence of *Chara* which was supposed to be the chief agent in marl deposition. These pebble marls are characteristic of shallow lakes and are a purer form of marl than is generally deposited by *Chara*. The rate of deposition varies widely in different beds, however, the maximum rate is probably one foot in seventy-five years. It is very probable that minute water organisms of various kinds absorb the carbon dioxide from the water for metabolic processes and leave the calcium carbonate to precipitate upon the twigs, plants, or bottom of the pool. [See Bot. Absts. 2, Entry 623.]—*R. P. Hibbard.*

556. Stoklasa, Julius. **Über die Verbreitung des Aluminium-Ions in der Pflanzenwelt. [The distribution of aluminium ions in diverse plants.]** Biochem. Zeitschr. 88: 292–322. 1918. —Xerophytes contain only a small aluminium content, at times only traces, in the various organs of the plant. Hydrophytes and hygrophilous plants are in general characterized by a relatively high aluminium content. Among many plants accumulating aluminium may be mentioned species of *Chara*, *Bryopsis*, species of brown and red marine algae, various species of the Filices, Equisetales, and Lycopodiales. Among higher plants in bog habitats containing high aluminium content are species of *Scirpus*, *Polygonum*, *Rumex*, etc. The author considers that the hygrophilous plants mentioned exhibit a quantitative selection capacity for aluminium ions, which are stored particularly in the subterranean organs. Mesophytes in general contain relatively small amounts of aluminium, unless they grow in moist situations, when the quantity is then noticeably increased.—*B. M. Duggar.*

557. Weevers, Th. **Die physiologische Bedeutung des Kaliums in der Pflanze. Schlusserwiderung auf die Mitteilung Stoklasas. [The physiological significance of potassium in the plant.]** Biochem. Zeitschr. 89: 281–282. 1918.

PHOTOSYNTHESIS

558. Ursprung, A. **Ueber die Absorptionskurve des grünen Farbstoffes lebender Blätter. [The absorption curves of green pigments in living leaves.]** Ber. Deut. Bot. Ges. 36: 73–85. 1918.

559. Ursprung, A. **Ueber die Bedeutung der Wellenlänge für die stärkebildung. [Wave length and starch formation.]** Ber. Deut. Bot. Ges. 36: 86–100. 1918.

560. Ursprung, A. **Energiekurven des vom Farbstoff grüner Blätter absorbierten Lichtes. [Curves of radiant energy absorbed by green leaves.]** Ber. Deut. Bot. Ges. 36: 111–121. 1918.

561. Ursprung, A. **Ueber das Vorhandensein einer photochemischen Extinktion beim Assimilationsprozess. [The assimilation process and photochemical extinction.]** Ber. Deut. Bot. Ges. 36: 122–135. 1918.

METABOLISM (GENERAL)

562. Albro, F. W. **Chemical constants of avocado oil.** Ann. Rept. California Avocado Assoc. 1917: 92–93. 1918. [See Bot. Absts. 1, Entry 507.]

563. Biedermann, W. **Mikrochemische Beobachtungen an den Blattzellen von Elodea. [Microchemical observations on leaf cells of Elodea.]** Flora 11-12: 560–605. 1918.

564. Black, O. F. **Calcium oxalate in the dasheen.** Amer. Jour. Bot. 5: 447–451. 1918. —Plants which produce calcium oxalate in bundles of fine, needle-like crystals packed in cells, when eaten raw invariably cause a burning sensation in the mouth. This work shows that calcium oxalate crystals are the cause of the acrid taste of the dasheen, and suggests that the plant be not discarded from the vegetable food supply, inasmuch as the acrid flavor can be removed by proper cooking.—*R. W. Webb.*

565. BOAS, FRIEDRICH. **Weitere Untersuchungen über die Bildung löslicher Stärke bie Schimmelpilzen mit besonderer Berücksichtigung der Frage nach der Eiweisssynthese der Schimmelpilze. [Concerning the formation of soluble starch by fungi with special reference to protein synthesis.]** Biochem. Zeitschr. 86: 110–124. 1918.—The formation of soluble starch by *Aspergillus niger* depends upon the hydrogen-ion concentration of the medium. Czapek's work on the synthesis of proteins from the amino acids by fungi is critically examined in the light of the hydrogen-ion concentration of the culture media. It is found that when the media has a sufficient hydrogen-ion concentration *Aspergillus niger*, *Penicillium*, and *Cladosporium* produce greater dry weights of mycelium when ammonium sulfate is the source of nitrogen than when amino acids are substituted.—*H. Schmitz.*

566. ELLIS, MARY T. **Contributions to our knowledge of the plant sterols. I. The sterol content of wheat (Triticum sativum).** Biochem. Jour. 12: 160–172. 1918. **II. The occurrence of phytosterol in some of the lower plants.** Biochem. Jour. 12: 173–177. 1918.

567. FELLENBERG, TH. VON. **Über die Konstitution der Pektinkörper. [The constitution of pectin bodies.]** Biochem. Zeitschr. 85: 118–161. 1918.—An extensive account of pectin bodies of diverse origin, their physical properties, constitution, derivatives, and the formation of fruit jellies.—*B. M. Duggar.*

568. GOERRIG, ELISABETH. **Vergleichende Untersuchungen über den Carotin- und Xanthophyllgehalt grüner und herbstlich gelber Blätter. [Carotin and xanthophyll in green and in autumn leaves.]** Beih. Bot. Centralbl. 35: 342–394. 1918.—Colorimetric determinations were made of the carotin and xanthophyll content of green leaves at the beginning of the autumn coloration, and of yellow leaves at the height of autumn coloration. The yellow pigments were extracted and separated according to Willstätter's methods. The carotin and xanthophyll extracts, diluted to 50 cc. and 100 cc., respectively, were compared with a 0.2 per cent, solution of potassium bichromate.—It was found that carotin increased or decreased in leaves during yellowing in autumn, depending upon the genus and upon weather conditions. During a clear warm autumn the carotin content of leaves of the following plants increased about twofold: *Aesculus hippocastanum, Acer platanoides, Fagus sylvatica, Platanus orientalis, Parrotia persica, Vitis coignetiae.* While the carotin content decreased greatly in leaves of the following plants: *Salix babylonica, Maclura aurantiaca, Broussonetia papyrifera.* —In a cold autumn with early frost it was found in all cases, with the exception of *Acer platanoides*, that there was less carotin and less xanthophyll in the yellow than in the green leaves.—*Sophia Eckerson.*

569. HAMMERSTEN, OLOF. **Einige Bemerkungen über das Erbsenlegumin. [Legumin of peas.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 85–104. 1918.

570. JAFFA, M. E., AND F. W. ALBRO. **Studies on the composition and nutritive value of some sub-tropical fruits.** Ann. Rept. California Avocado Assoc. 1917: 85–91. 1918. [See Bot. Abst. 1, Entry 533.]

571. KAUFFMAN, C. H. **The Agaricaceae of Michigan.** Michigan Geol. Biol. Survey Pub. 26 (Biol. Ser. 5). *Vol. 1, xxvii + 924 p. Frontispiece and fig. 1–4.* 1918. [Vol. 2, *in press.*] See Bot. Absts. 2, Entry 627.

572. KELLY, W. P. **A new sugar in the avocado.** Ann. Rept. California Avocado Assoc. 1917: 92. 1918. [See Bot. Absts. 1, Entry 537.]

573. KYLIN, HERALD. **Ueber die Fucosanblasen der Phaeophyceen. [Fucosan vacuoles.]** Ber. Deut. Bot. Ges. 36: 10–19. 1918.—Hansteen noted that granules, as he called them, accumulate about the chromatophores of Phaeophyceae during carbon-assimilation. He thought they were produced by the chromoplasts and were the first visible product of carbon-

assimilation. On this basis he called them fucosan granules. Kylin has made a rather extensive study of these bodies, the results of which are summarized in the article here reviewed. He finds that these bodies are vacuoles rather than granules and, while they are probably formed by the chromoplast in connection with carbon-assimilation, they are not made up in the main of carbon-synthate. He thinks he has shown that dextrose is the first carbon-synthate of the Phaeophyceae and that this is condensed to laminarin. These vacuoles may be the means by which the synthate leaves the plastid, but it is not stored in them. On the contrary it rapidly diffuses from them into the cytoplasm. He thinks these vacuoles, especially the older ones, are filled with substances resembling tannin but differing from true tannins in some respects. He considers these tannin-like substances as meaningless waste products, which upon oxidation give rise to the brown pigment of this group of plants, phycophaein, which was formerly considered a pigment of the chromatophores.—*Wm. Crocker*.

574. Meyer, Arthur. **Eiweiszstoffwechsel und Vergilben der Laubblätter von Tropaeolum majus. [Loss of chlorophyll.]** Flora 11-12: 85-127. 1918.—Meyer notes that in *Tropaeolum majus* growing in pots in a greenhouse the young leaves at the top of the stem are dark green while the progressively older ones down the stem are green, bright green, yellow green, yellow, and bright yellow, and finally the oldest ones on the plant are wilting. Meyer points out that this change in color is due to the gradual decomposition of the two chlorophylls, while the carotin and xanthophyll remain constant, as this change progresses the chloroplasts become smaller and in the later stages are shriveled granular masses with balls of excreted material about them. With the gradual loss of chlorophyll goes a similar decomposition of the proteins of the chloroplast. It should be mentioned that Meyer adduces evidence for the view that the chloroplast is the main organ for the storage of the proteins manufactured in the foliage leaf, if indeed not the very seat of protein manufacture. The amount of carbohydrates in the leaves also falls with age. Meyer found that when the leaves are placed in darkness no reduction occurs in the proteins until the carbohydrates are greatly reduced by respiration. The decomposition of the proteins then begins, he believes, as a source of carbon chains for respiration. He claims there is no loss of nitrogen from the leaf during this change but that the nitrogen residue remains in the leaf, while the carbon chain of the protein is used for respiration. He apparently gives the following interpretation of the process. As the leaves become older they become weakened. In this weakened condition the photosynthetic power falls. This leads to a great reduction in the amount of carbohydrates in the leaf and finally to the decomposition of the proteins of the chloroplasts as a carbon source for respiration. This decomposition of the proteins is accompanied by the decomposition of the chlorophyll and the change in color.—*Wm. Crocker*.

575. Meyer, Arthur. **Das Assimilationssekret von Vaucheria terrestris. [Assimilation in Vaucheria terrestris.]** Ber. Deut. Bot. Ges. 36: 235-241. 1918.

576. Meyer, Arthur. **Die angebliche Fettspeicherung immergrüner Laubblätter. [Fat storage in evergreen leaves.]** Ber. Deut. Bot. Ges. 36: 5-10. 1918.—A number of investigators have claimed that there is a considerable storage of fats in evergreen leaves during the winter. Meyer finds that the droplets that were supposed by these former workers to be fat droplets are not fat and that the total volume of these does not rise and fall with winter and summer, but that it increases continuously with the age of the leaf. He speaks of the droplets as "mesophyllsekret" and points out that little is known of the origin and composition of them. Some of the forms studied were: *Ilex aquifolium*, *Taxus baccata*, *Vinca minor*. The methods used by Meyer, as well as by former workers, are exclusively microchemical—*Wm. Crocker*.

577. Molisch, Hans. **Über den microchemischen Nachweis und die Verbreitung gelöster Oxalate im Pflanzenreiche. [Dissolved oxalates in plants.]** Flora 11—12: 60-70. 1918.—Molish finds dissolved oxalates appearing rather generally distributed in phanerogams. All investigated species of the following families bore much dissolved oxalate: Polygonaceae, Chenopodiaceae, Amarantaceae, Aizoaceae, Begoniaceae, Melastomaceae, Oxalidaceae, Can-

naceae, and Marantaceae. While in most cases this chemical character, like many other chemical characters, runs by families, this is not always the case. In certain families some genera are very rich in dissolved oxalates while other genera contain little or none. This is true of Commelinaceae and Cactaceae.—*Wm. Crocker.*

578. MOLISCH, HANS. **Beiträge zur Mirkochemie der Pflanzen. No. 10. Ueber Kieselkörper in der Epidermis von Campelia Zanonia. No. 11. Kristallisiertes Karotin in der Nebenkrone von Narcissus poeticus. [Microchemistry of plants. No. 10. Silicia bodies in the epidermis of Campelia Zanonia. No. 11. Crystalized carotin in the corolla of Narcissus poeticus.]** Ber. Deut. Bot. Ges. 36: 277–282. 1918.

579. RHEIN, M. **Über den Abbau des Tyrosins durch Bact. coli phenologenes nebst einer Notiz über die Zusammensetzung der Harnphenole des Menschen. [The decomposition of tyrosin by Bacterium coli phenologenes.]** Biochem. Zeitschr. 87: 123–128. 1918.

580. STEWART, ALFRED W. **Recent advances in organic chemistry.** *3rd ed. 350 p., 1 chart.* Longmans, Green and Co.: London, 1918.—The third edition of this work exhibits much new material, although only eight years have elapsed since the previous edition. Physiologists interested in the biochemical aspects of the subject will find particularly applicable the extensive treatment of such sections as the following: V, Rubber; VI, The Alkaloids; VII, The Polypeptides; VIII, The Chlorophyll Problem; IX, The Anthocyanins; and X, Some Theories of the Natural Synthesis of Vital Products. The author makes it clear that the book is not intended merely as a compilation of facts, but rather as a work at once critical and suggestive of the directions of research.—*B. M. Duggar.*

581. WOLF, C. G. L. **Contributions to the biochemistry of pathogenic anaerobes. V. The biochemistry of Vibrion septique.** Jour. Path. and Bact. 22: 115–128. 1918.—This organism attacks primarily carbohydrates. Although growing freely in the absence of carbohydrate and producing gas, the addition of carbohydrate greatly accelerates the metabolic process. In gas-forming capacity it falls within the range of *Bacillus welchii*, but acid production is not so marked as in the latter. The proteolytic action is comparable with that of *B. welchii*. The addition of a small amount of fresh tissue to a medium affording little growth results in stimulating growth activity.—*B. M. Duggar.*

METABOLISM (NITROGEN)

582. DAVISSON, B. S. **Ammonia and nitric nitrogen determinations in soil extracts and physiological solutions.** Jour. Indust. and Eng. Chem. 10: 600. 1918.—The results show that a modification of the aeration method as employed by Folin in the determination of ammonia is applicable when large volumes of soil extracts and physiological solutions are used.—*R. W. Webb.*

583. HUTCHINSON, H. B. **The influence of plant residues on nitrogen fixation and on losses of nitrate in the soil.** Jour. Agric. Sci. 9: 92–111. *Fig. 1–3.* 1918.—Experiments give evidence that the nitrogen content of sand or soil may be appreciably increased by the activity of *Azotobacter* when dextrose and saccharose are supplied as a source of energy. Plant residues added to soil cultures gave similar results. In laboratory experiments there was a gain of nearly 6 mg. of N per gram of plant residue, and in pot experiments there was realized a gain of 9 mg. per gram of substance added. Besides this source of energy supply there is also necessary a suitable temperature and a supply of phosphates and calcium carbonate. Under the most favorable circumstances for nitrogen fixation there is, after the addition of the organic materials, a period of activity involving processes adverse to growth, and before these have run to completion it is not advisable that a crop be introduced.—*S. M. Zeller.*

584. SEN, J. N. **The influence of potsherds on nitrification in the Indian alluvium.** Jour. Agric. Sci. 9: 32–42. *Fig. 1–4.* 1918.—The influence of different percentages of potsherds

in soils on the formation of nitrates was studied. Oxygen and nitrates were estimated in the solution which percolated from jar cultures. The nitrates and oxygen were more concentrated in those cultures containing potsherds. In experiments in lysimeters samples of soil were taken from different layers of soil every fortnight and the results are shown graphically. In these cases also an increase in the quantity of potsherds seems to increase the proportion of nitrate.—*S. M. Zeller.*

585. Euler, Hans. **Über Enzymbildung. [Enzyme formation.]** Biochem. Zeitschr. 85: 406–417. 1918.—Data are given substantiating the theory that the formation of invertase does not occur through a splitting off or secretion by the protoplast or other cell substances but through a synthesis. The energy liberated through fermentation is essential to this synthesis.—*H. Schmitz.*

586. Euler, Hans, and Olof Svanberg. **Untersuchungen über die chemische Zusammensetzung und Bildung der Enzyme. XV. Neue Messungen an Bact. acidi lactis (Streptococcus lactis). [The chemical composition and formation of enzymes. New measurements with Bacterium acidi lactis.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 176–184. *Fig. 1–2.* 1918.

587. Hammersten, Olof. **Studien über Chymosin- und Pepsinwirkung. IV. Die Wirkung der Enzyme auf Natriumcaseinate. [The action of chymosin and pepsin upon sodium caseinate.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 33–77. 1918.

588. Hammersten, Olof. **Studien über Chymosin- und Pepsinwirkung. V. Wirkung der Enzyme auf Erbsenlegumine. [The action of chymosin and pepsin upon legumin of peas.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 105–147. 1918.

589. Ivanov, N. **On the nature of the proteolytic enzyme of yeast.** Biochem. Jour. 12: 106–119. 1918.—The estimation of nitrogen in protein was obtained by the Stutzer method, and the quantity of amino-groups by the Van Slyke method. Lebedev's dried yeast and hefanol (a Munich preparation of dried yeast) were used as the sources of enzymes. Acidity produced by monopotassium phosphate considerably increases the rate of decomposition of protein up to the peptone stage. If the temperature is lowered (from 46°C. to 34°C.) peptase action continues so that practically all of the peptone is converted into amino-acids after seven days. At a temperature of 75° peptase action is entirely suppressed, and 19 per cent alcohol similarly destroys the activity of this enzyme. Alkalinity produced by dipotassium phosphate inactivates the protease and activates the peptase.—*S. M. Zeller.*

590. Jacoby, Martin. **Über Bakterien-Katalase. [Catalase in bacteria.]** Biochem. Zeitschr. 89: 350–354. 1918.

591. Jacoby, Martin. **Über die Einwirkung der Aldehyde auf die Urease. [The action of aldehydes upon urease.]** Biochem. Zeitschr. 85: 358–364. 1918.—Aldehydes inhibit urease action, probably due to the formation of an aldehyde-enzyme combination.—*B. M. Duggar.*

592. Jacoby, Martin. **Über Fermentbildung VI, VII. [Enzyme formation.]** Biochem. Zeitschr. 88: 35–42. 1918.—See Bot. Absts. 2, Entry 836.

593. Jacoby, Martin. **Über die Wirkung der Cyanhydrine auf Fermente und Bakterien. [The action of cyanhydrin on ferments and bacteria.]** Biochem. Zeitschr. 87: 129–134. 1918.

594. Lebedev, Alexandre. **Sur la fermentation de l'acide glyoxylique. [Fermentation of glyoxalic acid.]** Biochem. Jour. 12: 81–86. 1918.—Experiments show that the action of yeast on glyoxalic acid is very marked. As far as this acid is concerned, the products of its decomposition, excepting carbon dioxide and acetaldehyde, are an open question. Alcohol

is probably a product if there is a simple reduction of acid as in the reaction: $CHO.CO_2H + 8H = 2H_2O + CH_3.CH_2OH$. Then acetaldehyde follows as an oxidation product. The ethyl alcohol which is formed anaerobically in plant tissues does not always result from sugar, and among other organic acids glyoxalic acid may have to be added to the probable sources of this alcohol.—*S. M. Zeller.*

595. Lebedev. Alexandre. **Sur la formation des éthers phosphorés pendant la fermentation alcoolique. [Formation of phosphoric esters in alcoholic fermentation.]** Biochem. Jour. 12: 87–92. 1918.—Fifty grams of yeast were added to a nutrient solution containing 100 grams saccharose, 35 grams monosodium phosphate, 17 grams disodium phosphate and 1 cc. of toluene in 500 grams of water. By preparations of p-bromphenylhydrazone, p-bromphenylosazone, and phenylosazone, it was demonstrated that a mixture of phosphoric esters was produced during fermentation. These esters differ from the hexose-phosphate which the author has discussed in a previous paper.—*S. M. Zeller.*

596. Meyerhof, Otto. **Über das Gärungscoferment im Tierkörper. [The co-ferment of alcoholic fermentation in the animal body.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 1–32. 1918.

597. Meyerhof, Otto. **Zur Kinetik der zellfreien Gärung. [The kinetics of cell-free alcoholic fermentation.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 185–225. *Fig. 1–7.* 1918.—This paper concerns itself with alcoholic fermentation along the general lines developed by Harden and Young. He notes an induction period characteristic of yeast sap after the addition of sugar. At first fermentation shows a strong increase due to the free phosphate contained in the sap; the rise in the velocity of the reaction gradually develops, more slowly the higher is the concentration of phosphate at the beginning. He has also been able to develop a salt action due to phosphates or other salts. When an ester of hexose phosphoric acid is added the rise in the fermentation curve is more rapid, and is not dependent upon the hexose set free. With increase in the co-ferment the fermentation curve rises, and fermentative action corresponds more nearly to the concentration of the co-ferment than to any relation to zymase content. The inhibition of zymase and of hexose phosphatase in the sap are similar. On the other hand, in dry yeast the fermentation of the hexose phosphate is inhibited by smaller concentrations, and these lie between those for the sap and those inhibiting action in the living cells.—*B. M. Duggar.*

ORGANISM AS A WHOLE

598. Büsgen, M. **Biologische Studien mit Botrytis cinerea. [Biological studies of Botrytis cinerea.]** Flora 11-12: 606–620. 1918.

599. Kidd, F., and C. West. **Physiological predetermination: the influence of the physiological condition of the seed upon the course of subsequent growth and upon the yield. II. Review of literature.** Ann. Appl. Biol. 5: 112–138. *Fig. 1–2.* 1918.—A review of the literature on this subject reveals two groups of environmental conditions influencing the seed while on the parent plant. First, the effect of the position of the seed is reflected in the size of this structure, and is independent of external conditions. Second, the environment as affecting the parent plant may, however, influence the course of development of the seeds produced in subsequent generations.—*S. M. Zeller.*

600. Sinnott, Edmund W. **Factors determining character and distribution of food reserves in woody plants.** Bot. Gaz. 66: 162–175. *2 fig.* 1918.—See Bot. Absts. 1, Entry 580.

GROWTH AND DEVELOPMENT, REPRODUCTION

601. Klebs, Georg. **Über die Blütenbildung von Sempervivum. [Conditions affecting flower development.]** Festschrift, Stahl. *P. 128–151.* Jena, 1918.—Klebs divides the process of flower formation by the rosettes of *Sempervivum Funkii* and *S. albidum* into three dis-

tinct successive steps: (1) production of the condition of ripeness to flower (blühreife Zustande), (2) formation of flower primordia and (3) development of flower clusters and elongation of the axis. Light is the dominant factor in determining all three of these stages of development.—In the first and third, light is effective entirely through its photosynthetic action and its effectiveness rises with its energy value. Higher temperatures counteract light by favoring dissimilation. Accordingly the effect of high temperatures can be in part annulled by increased light intensities. It is the balance of carbon-assimilation over dissimilation that furthers the development of these two stages. Klebs finds that at lower temperatures (about 6°C.) both these stages can be attained in darkness although in the last it gives a far less extensive inflorescence. Klebs thinks this is likewise tied up with a balance in favor of available carbon synthate. The lower temperature gives low respiration and leads to the accumulation of soluble sugars by the hydrolysis of insoluble carbohydrates.—In the second step, formation of flower primordia, light has two distinct and antagonistic effects. The one which favors the process is due to the photosynthetic activity of the light and is a function of the less refrangible rays of the spectrum. The other, which inhibits the process or even annuls the ripe to flower condition must at present be termed a stimulus effect and it is a function of the less refrangible blue rays. Diffuse daylight is relatively injurious to primordia development because of the high percentage of blue violet rays it contains. The Osram light and direct sunlight favor this development because of the dominance of the red rays.—Klebs says it is still an unanswered question whether inflorescence development in other forms and in plants in general can be divided into these three distinct steps with similar light effects in each step. He suggests some facts as evidence that such may be the case. Klebs past work has done much to show that the formative effects of conditions on plants is largely through the nutrient effects of these conditions. Thus the formative effect of light is explained in a large part by its effect on carbon-assimilation, but Klebs points out here as in his older work that there is also a specific formative action of the blue rays as yet unexplainable on the nutrient basis.—*W. Crocker.*

602. KNIEP, HANS. **Über die Bedingungen der Schnallenbildung bei den Basidiomyzeten. [Conditions for beak formation in the Basidiomycetes.]** Flora 11-12: 380-395. 1918.

603. KÜSTER, ERNST. **Über rhythmisches Dickenwachstum. [Rhythmical secondary growth thickening.]** Flora 11-12: 621-640. 1918.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

604. MÖBIUS, M. **Über Orientierungsbewegungen von Knospen, Blüten und Früchten. [Movements of orientation in buds, flowers, and fruits.]** Flora 11—12: 396-417. 1918.

605. SLATOR, A. **Some observations on yeast growth.** Biochem. Jour. 12: 248-258. 1918. —In this paper a method of measuring the logarithmic constant of growth and the generation-time of micro-organisms is described, and the importance of such measurements in an investigation of the growth of these organisms and of the chemical action brought about by them is discussed.—*S. M. Zeller.*

606. WOKER, GERTRUD. **Zur Physik der Zellkernteilung. [The physics of cell division.]** Zeitschr. Allgem. Physiol. 18: 39-57. *Fig. 1-14.* 1918.

607. ZOLLIKOFER, CLARA. **Ueber das geotropische Verhalten entstärkter Keimpflanzen und den Abbau der Stärke in Gramineen-koleoptilen. [Statolith starch.]** Ber. Deut. Bot. Ges. 36: 30-38. 1918.—Miss Zollikofer finds that the statolith starch of seedling organs is relatively readily removed by periods of illumination followed by periods of darkness, but it is persistent in organs grown continually in darkness. The persistence of the statolith starch is a function of the degree of etiolation. This the writer considers a biological adaptation. By growing seedlings of *Fagates erecta* and seedlings of other Compositae in light one to four

days followed by three to four days of darkness, hypocotyls were obtained that bore no statolith starch. These hypocotyls were still growing and capable of phototropic movement but incapable of geotropic movement. Light rendered them geo-sensitive only after it had produced statolith starch. Working by similar methods the author shows a close relation between the amount of mobile starch and geo-sensitivity in the coleoptile of grasses.—*Wm. Crocker.*

GERMINATION, RENEWAL OF ACTIVITY

608. Moore, W., and H. K. Hayes. **A new maize secret.** Jour. Agric. Victoria 16: 123–124. 1918.—The fumes of nitrobenzine are reported to increase the rate as well as the percentage of germination.—*B. M. Duggar.*

REGENERATION

609. Figdor, Wilhelm. **Zur Kenntnis des Regenerationsvermögens von Crassula multicava Lem. [Regeneration capacity in Crassula multicava.]** Ber. Deut. Bot. Ges. 36: 241–246. 1918.

610. Magnus, Werner. **Wund-Callus und Bakterien-Tumore. [Wound-callus and bacterial tumors.]** Ber. Deut. Bot. Ges. 36: 20–29. 1918.—Polar difference in wound-callus formation has often been observed in stems and less frequently in root structure. Magnus finds that segments of the root of a half long carrot with which he worked produced a wound-callus on the morphologically apical face but not on the basal face. This occurred whether the apical face was oriented upward or downward in the moist chamber. The callus starts at the cambium ring and spreads centripetally. When the apical face is infected with *Bacterium tumefaciens* the callus development is much greater. When the basal face is infected there is a considerable development of tumors on that face and this acts in a correlative way to inhibit the normal tumor development on the apical face. Mangus also worked with a long fodder carrot. While infection in this form increased the callus development on the apical face of the segments tenfold, it induced very little tumor development on the basal face and accordingly showed little correlative effect in inhibiting the normal callus development on the apical face.

Magnus offers evidence for the view that the tumor-inducing organism in plants is not identical with that in man. He also suggests that certain conclusions of Blumenthal and Hirschfield on the effect of *Diplococcus* on tumor formation in plants may be wrong because they failed to recognize the polar disposition to callus formation in plants. He thinks the studies on tumor formation in plants will finally throw much light on cancer development.—[See Bot. Absts. 2, Entry 777.]—*Wm. Crocker.*

LIGHT RELATIONS

611. Lehmann, Ernst. **Ueber die minimal Belichtungszeit welche die Keimung der Samen von Lythrum salicaria auslöst. [Minimum illumination interval for the germination of seed of Lythrum.]** Ber. Deut. Bot. Ges. 36: 157–163. 1918.—Lehmann finds that in a germinator at 30°C. 0.1 second's illumination with 730 H. K. is sufficient to cause 50 per cent of the seeds of *Lythrum salicaria* to germinate within twenty-four hours, whereas only 6 to 7 per cent germinate in similar condition in darkness and not more than 7 per cent after ten days.—*Wm. Crocker.*

612. Shamel, A. D. **Some effects of shading lemon trees.** Monthly Bull. California State Comm. Hort. 7: 441–451. *4 fig. 8 tables.* 1918. [See Entry Bot. Absts. 1, Entry 554.]

TOXIC AGENTS

613. Knaffl-Lenz, E. von. **Beitrag zur Theorie der Narkose. [The theory of narcosis.]** Arch. Exp. Path. und Pharm. 84: 66–87. *1 fig.* 1918.—It is shown that volatile water-soluble narcotics are absorbed by gelatine gels in the absence of lipoids, and such gels swell as a result. Water-insoluble petroleum ether is not absorbed and therefore produces no swelling. The author concludes, contrary to Traube, that narcotics diminish swelling effects rather than increase such effects.—*B. M. Duggar.*

614. Wehmer, C. **Leuchtgaswirkung auf Pflanzen, 4. Die Wirkung des Gases auf das Wurzelsystem von Holzpflanzen; Ursache der Gaswirkung. [The effects of illuminating gas upon plants.]** Ber. Deut. Bot. Ges. 36: 140–149. 1918.—Wehmer has studied the effect of passing continuous streams of illuminating gas through the soil bearing potted herbaceous as well as three to seven year old wooded plants. There was a great difference in the amount of injury according to the stage of development. In the spring the trees were entirely killed in a relatively short time. This is in general the sort of reaction given by the actively growing herbaceous forms at all times. In late summer and early fall the injury is less marked and is shown mainly by leaf fall, while in the dormant period of winter the trees are very resistant. Where investigated the embryo in the resting seed and the seedling stage proved very sensitive. Cuttings stood in gas-impregnated water showed, with few exceptions (*Ilex*) seasonal variations in sensitiveness similar to the plants rooted in soils. In spite of this the author thinks that injury to parts above the soil is in part a secondary result of root injury. The injury is due to toxic constituents of the gas and not to mere displacement of oxygen by the gas as Sorauer has suggested. The toxic constituents increase or decrease with the conditions that lead to an increase or a decrease in the odor producing materials. The author promises a later paper on the toxic constituents.—*Wm. Crocker.*

MISCELLANEOUS

615. Brenchley, W. E. **Buried weed seeds.** Jour. Agric. Sci. 9: 1–31. 1918.—The viability was tested of weed seeds, which had been buried at various depths for known lengths of time and under known field conditions. The results show how closely the flora derived from such buried seeds is associated with the history of the land, i.e., permanent grassland is devoid of arable weeds; continual close grazing hinders seed production and reduces the number of seeds that become buried. Mowing may allow of the ripening of early species. Permanent grasslands have a distinct buried flora, which is chiefly pasture plants while grassland that has once been arable contains a large number of seeds common to both pasture and arable lands. True arable weed seeds may be found in soil which has been grassed over for at least fifty-eight years. The seeds survive best in the lower layers of soil.—*S. M. Zeller.*

616. Gortz, Otto. **Ueber einige durch schmarotzende Cuscuta hervorgerufene Gewebeveränderungen bei Wirtspflanzen. [Structural changes induced in the host by Cuscuta.]** Ber. Deut. Bot. Ges. 36: 62–72. 1918.

617. Hutchinson, H. B., and A. C. Thaysen. **The non-persistence of bacterio-toxins in the soil.** Jour. Agric. Sci. 9: 43–62. *Fig. 1–4.* 1918.—Seven soils were examined to ascertain whether partial sterilization effects may be due to the destruction of bacterio-toxins in the soil. Untreated extracts of the soils differed greatly in their suitability for the growth of *Bacillus prodigiosus.* Heating the extracts lowered the bacterial count, while the addition of antiseptics to the extracts was usually more favorable for bacterial growth than the untreated extracts. Additions of peptone to unfavorable extracts rendered them favorable media. Extracts of very poor untreated soils were inoculated with a common soil organism, *B. fluorescens liquefaciens,* and there was no evidence of toxicity of the soil. The value of the extract of an acid heath soil was distinctly increased after heating. By the continual growth of *B. prodigiosus* on a solution an unfavorable medium is obtained, due to diminution of food value and an increase of toxins. This substance is stable to heat and does not resemble the toxins which are alleged to occur in the soil.—*S. M. Zeller.*

618. KOLKWITZ, R. **Über die Schwefelbakterien-Flora des Solgrabens von Artern.** **[Sulphur bacterial flora.]** Ber. Deut. Bot. Ges. 36: 218-224. 1918.

619. NEGER, F. W. **Die Wegsamkeit der Laubblätter für Gaze.** **[Aeration systems of leaves.]** Flora 11-12: 152-161. 1918.—Neger has earlier spoken of two types of leaves on the basis of the nature of their intercellular systems—heterobasic and homobasic. In a recent article he compares a heterobasic leaf to a house with thousands of rooms lacking communicating doors, and a homobasic leaf to a similar house with communicating doors present and all open. In the first type the intercellular system is divided into many small isolated regions by the smaller veins with the resulting possibility of different air pressure existing in each, while in the second the whole intercellular system of the leaf is connected and therefore the same pressure exists throughout. Most plants with flat leaves have heterobasic leaves and the size of the individual chambers vary considerably. In various species of *Quercus* they run from 1/840 to 1/1400 sq. cm. and in *Syringa vulgaris* from 1/8 to 1/10 sq. cm. In the same species shade leaves have larger chambers than sun leaves. The following trees and shrubs have homobasic leaves *Evonymus japonica*, *Ilex aquifolium*, *Prunus laurocerasus*, *Hedera helix*, *Ardisia crispa* and all needle-bearing trees and shrubs. When injured by smoke the homobasic leaves show the injury to the whole leaf due to the gases distributing themselves throughout the whole intercellular system, while the heterobasic leaves show the injury in spots corresponding to individual intercellular chambers.—*Wm. Crocker.*

620. RODENWALD, H. **Der Vegetationsversuch.** **[Vegetation experiment.]** Ber. Deut. Bot. Ges. 36: 199-201. 1918.

621. TREVAN, J. W. **The viscosity of blood.** Biochem. Jour. 12: 60-71. *Fig. 1-4.* 1918. —As the title suggests, the author describes and discusses a viscosimeter in which stirring the liquid during the observations is possible.—*S. M. Zeller.*

622. URSPRUNG, A., AND A. GOCKEL. **Ueber Ionisierung der Luft durch Pflanzen.** **[Ionization of the air by plants.]** Ber. Deut. Bot. Ges. 36: 184-192. 1918.

TAXONOMY OE NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

ALGAE

623. POLLOCK, JAMES B. **Blue-green algae as agents in the deposition of marl in Michigan lakes.** Rept. Michigan Acad. Sci. 20: 247-260. *Pl. 16-17.* 1918.—Marl formation in Michigan lakes is discussed, the agency being various species of Cyanophyceae belonging to the genera *Schizothrix*, *Lyngbya*, *Rivularia*, *Dicothrix*, *Stigonema*, *Gloeocapsa*, *Gloeothece*, and various bacteria. The fossil genus *Girvanella* is shown to be probably one of the genera of Cyanophyceae. [See Bot. Absts. 2, Entry 555.]—*E. A. Bessey.*

FUNGI

624. BEACH, WALTER S. **The Fusarium wilt of china aster.** Rept. Michigan Acad. Sci. 20: 281-308. *Pl. 18-22, fig. 28.* 1918.—A detailed study of the wilt of aster and of its causal organism, which is described under the name *Fusarium conglutinans* Wollenweber var. *callistephi* n. var.—*E. A. Bessey.*—See Bot. Absts. 3, Entry 97.

625. BONAR, LEE. **The rusts of the Douglas Lake region.** Rept. Michigan Acad. Sci. 20: 277-278. 1918.—A list of forty species of rusts collected in the summer of 1917 in the vicinity of Douglas Lake in Cheboygan and Emmet counties, Michigan, and determined by Professor J. C. Arthur.—*E. A. Bessey.*

626. Graves, Arthur Harmount. **Some diseases of trees in greater New York.** Mycologia 11: *Pl. 10.* 1919.

627. Kauffman, C. H. **The Agaricaceae of Michigan.** Michigan Geol. Biol. Survey Pub. 26 (Biol. Ser. 5). *Vol. 1,* xxvii + *924 p. Frontispiece and fig. 1-4.* 1918. [Volume 2, *in press.*]—This work is the result of ten years' study by the author on the mushrooms of Michigan. A general introduction on the structure of agarics, distribution, collecting and preserving, etc., is followed by keys to the genera. The genera and species are then taken up under the following sub-family heads: Cantherelleae, Marasmieae, Lactarieae, Hygrophoreae, and Agariceae. For each genus there is a key to the species. The latter are described in great detail and the distribution is stated as far as known. Under each species is given the reference to the original place of publication and to the illustrations of that species. No synonyms are given. The nomenclature follows the Brussels rules of 1910. New species are described in several genera. 884 species are included in the book, not all of which, however, are at present known in Michigan, inasmuch as the known species of the whole northeastern United States have been included in a number of genera, e.g., *Cortinarius*, *Pholiota*, etc. The genus *Coprinus* is monographed by L. H. Pennington. The final chapter, on mushroom poisoning, is by Dr. O. E. Fischer. A rather detailed bibliography follows, including monographs on various genera. A large glossary and index complete the book. Volume 2, containing the plates, is in press. These plates are excellent heliotype reproductions of photographs taken for the most part by the author, the illustrations being life-size.—*E. A. Bessey.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

628. Baird, Viola B. **Field notes on Ericaceae of the Tahoe region.** Madroña 1: 66-68. 1918.—Fourteen species of this group are recorded from the Lake Tahoe region of California. —*J. M. Greenman.*

629. Bergman, Herbert F. **Flora of North Dakota.** Bienn. Rept. Soil & Geol. Survey North Dakota 6: 151-372. [Chapter XII.] 1918.—The present "Flora" includes the flowering plants, ferns, and fern-allies. The arrangement of families is essentially that of the late Professor Bessey. Keys lead to the families, genera, and species enumerated, but no descriptions of species are given. A general account of the botanical expeditions, the main geological and physiographical features, as well as the types of vegetation of the state precede the taxonomic part of the work.—*J. M. Greenman.*

630. Craib, William Grant. **Primulae Novitates Nonnullae. [Some novelties of Primula.]** Notes Roy. Bot. Gard. Edinburgh 10: 205-210. 1918.—*Primula aequalis* Craib, *P. orestora* Craib & Cooper, and *P. pauciflora* Watt are described from specimens collected in India as species new to science. *P. erythrocarpa* and *P. platycrana* Craib are described as new species from plants grown in the Royal Botanic Garden of Edinburgh from seeds collected in Bhutan, India.—*J. M. Greenman.*

631. Craib, William Grant. **Gesneracearum Novitates Nonnullae. [Some novelties of the Gesneraceae.]** Notes Roy. Bot. Gard. Edinburgh 10: 211-219. 1918.—Craib describes the following plants of China as new to science: *Chlamydoboea connata, Perantha minor* gen. et sp. nov., *P. Forrestii, P. cordatula, Petrocosmea Henryi, Tremacron Forrestii* gen. et sp. nov., and *T. Mairei.*—*J. M. Greenman.*

632. Koorders, S. H. **Abbildung und Beschreibung von Rafflesia atjehensis aus Nord-Sumatra. [Illustration and description of Rafflesia atjehensis from North Sumatra.]** Bull. Jard. Bot. Buitenzorg III, 1: 77-81. *Pl. 1-3, Fig A-K.* 1918.—The author gives a detailed description of this parasitic species and accompanies the same by an illustration.—*J. M. Greenman.*

633. Koorders, S. H. **Notiz über eine neue abbildung von Rafflesia Hasseltii Sur. [Notice of a new illustration of Rafflesia Hasseltii Sur.]** Bull. Jard. Bot. Buitenzorg III, 1: 82–83. *Pl. 4.* 1918.—Further notes are recorded concerning *Rafflesia Hasseltii* Sur., and a hitherto unpublished illustration of this species is presented.—*J. M. Greenman.*

634. Koorders, S. H. **Beitrag zur Kenntniss der flora von Java No. 9. Beschreibung und abbildung von einer neuen art von Prunus aus West-Java. [Contribution to the knowledge of the flora of Java No. 9. Description and illustration of a new species of Prunus from West Java.]** Bull. Jard. Bot. Buitenzorg III, 1: 84–85. *Pl. 5. Fig. A–L.* 1918.—*Prunus pseudoadenopoda* is described and illustrated as a new species from western Java.—*J. M. Greenman.*

635. Kops, Jan, F. W. van Eeden, and L. Vuyck. **Flora Batava. Afbeelding en Beschrijving der Nederlandsche Gewassen. [Flora of Holland. Illustrations and descriptions of the plants of Holland.]** Parts 392^{e}–395^{e}. *Pl. 1961–1976.* Nijhoff: s'Gravenhage. 1918.—The present parts contain illustrations and descriptions of several vascular and non-vascular plants. The vascular plants included are: *Rubus apricus* Wimmer, *Thlaspi perfoliatum* L., *Silene stricta* L., *Oenanthe pimpinelloides* L., *Rubus caesius* L. *forma glandulosus* Focke, and *Polygonum patulum* Bieb.—*J. M. Greenman.*

636. Merrell, E. D. **Description of a new species of Pollinia in Java.** Bull. Jard. Bot. Buitenzorg. III, 1: 16. 1918.—*Pollinia geminata* is described as a new species from Java.—*J. M. Greenman.*

637. S[mith], W. W. **Diagnoses specierum novarum in herbario Horti Regii Botanici Edinburgensis cognitarum (Species asiaticae). [Diagnoses of new species found in the herbarium of the Royal Botanic Garden of Edinburgh (Asiatic Species).]** Notes Roy. Bot. Gard. Edinburgh 10: 167–204. July, 1918.—The following new species and varieties are described, and their authorship is attributable to W. W. Smith unless otherwise indicated: *Anaphalis rhododactyla, Asystasia silvicola, Chirita chlamydata, C. Dalzielii, C. umbricola, Chrysanthemum jugorum, C. jugorum* var. *tanacetopsis, Daedalacanthus Wardii, Dicliptera elegans, D. induta, Elsholtzia penduliflora, Eranthemum shweliense, E. tapingense, Helicia annularis, H. clivicola, H. pallidiflora, H. shweliensis, H. silvicola, H. vestita, Hemigraphis fluviatilis* Clarke, *Justicia albovelata, J. microdonta, J. Wardii, Loranthus scoriarum, Lysionotus Forrestii, L. gracilis, L. Wardii, Peristrophe yunnanensis, Phacellaria ferruginea, Phytolacca clavigera, Rhynchanthus Beesianus, Strobilanthes arenicolus, S. Austini* Clarke, *S. claviculatus* Clarke, *S. Cyclus* Clarke, *S. fimbriatus* Nees var. *manusculus, S. Hancockii* Clarke, *S. hupehensis, S. hygrophiloides* Clarke, *S. Lamium* Clarke, *S. mekongensis, S. oresbius, S. pinetorum, S. polyneuros* Clarke, *S. psilostachys* Clarke, *S. rufohirtus* Clarke, *S. scoriarum, S. stramineus, S. Wardii, Tanacetum elegantulum, T. glabriusculum,* and *T. oresbium.*—*J. M. Greenman.*

638. Trelease, William. **Winter Botany. A companion volume to the author's Plant Materials of Decorative Gardening.** *10 x 14 cm.,* XL × *394 p., numerous text fig.* Published by the author: Urbana, Ill. 1918.—This little volume deals primarily with trees and shrubs in their winter state. A dichotomous key, based largely on position of leaves, character of leaf-scar, nature of pith, etc., leads the reader to the various genera included of which there are 326 belonging to 93 families. The volume is copiously illustrated with text figures.—*J. M. Greenman.*

639. van Leeuwen-Reynvaan, W. and J. **Niederländisch Ost-Indische Gallen. No. 10. Einige gallen aus Java, achter beitrag. [Dutch East India Galls No. 10. Some galls from Java, eighth contribution.]** Bull. Jard. Bot. Buitenzorg III, 1: 17–76. *Text fig. 98.* 1918.—While this paper is concerned primarily with plant galls of Java, yet there is recorded a good deal of information concerning the plants of Java, which is of interest to the taxonomist as well as the student of plant geography.—*J. M. Greenman.*

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Note:—The four months, June to September, are omitted. Vol. II ends with no. 6, December.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

640. BERGMAN, H. F. **A report on the plant survey of Barnes county, North Dakota.** Bienn. Rept. Dir. Agric. Coll. Surv. North Dakota (1911–1912) 6: 121–150. 1918.—Work was begun on the survey in 1905 and continued presumably during the summer months until 1911. The country varies from flat to undulating prairie. Woodland is confined to narrow strips along the banks of streams. Marsh lands also occur, but prairie land is the most extensive and characteristic of this country, although grama (*Bouteloua*) is the most abundant grass. *Andropogon* and *Bouteloua* are predominant in the moist valleys while on the uplands *Stipa* and *Bouteloua* are predominant. The true Buffalo grass (*Bulbilis*) forms occasional patches. This publication also contains lists of the more important species and a catalogue of plants. —*H. L. Shantz.*

641. BERGMAN, H. F. **Flora of North Dakota.** Bienn. Rept. Dir. Agric. Coll. Surv. North Dakota (1911–1912) 6: 151–372. 1918.—In the introduction to the flora an account is given of the early exploration, of the later collections and a description of the physiography of the state. The vegetation shows little diversity. Timbered areas are limited largely to stream banks and to the Turtle mountains and consist largely of elm, ash, box-elder, oak and hackberry; the prairie is divided into *Bouteloua-Bulbilis*, or short grass prairie and *Andropogon* prairie. The latter is limited in the east by high soil water content and is replaced in the west on the drier soils by the short grasses. In the southwest yellow pine and juniper occur in the badlands. A discussion is given of the vegetation of alkali lands, wet meadows, river banks and of the weeds of cultivated fields.—*H. L. Shantz.*

642. CANNON, W. A. **The evaluation of the soil temperature factor in root growth.** Plant World 21: 64–67. Mar., 1918.—It is shown that the product formed by the rate of root growth at a given temperature (*R*) and the duration of this temperature (*T*) is a datum of ecological importance in investigating distributional controls. The product *TR* has been determined for *Covillea* for Tucson, Arizona, and Carmel, California, on the basis of growth measurements of roots under controlled conditions, and of detailed inspection of soil thermograph records. The expected root growths under natural conditions at Tucson and Carmel are respectively 74 mm. and 588 mm. This plant is characteristic at Tucson and can not be made to grow at Carmel.—*Forrest Shreve.*

643. COLLINS, MARGORIE ISABEL. **On the leaf anatomy of Scaevola crassifolia, with special reference to the epidermal secretion.** Proc. Linn. Soc. New South Wales, 42: 247–259.

6 fig. 2 pl. Sept., 1918.—A morphological study of the leaf structures of *Scaevola crassifolia*, a xerophytic sand-dune plant of the Goodeniaceae growing near Adelaide. All stages are included in the investigation from the earliest formative structures to the mature leaves. Closely set, peltate, glandular hairs covering the surface of the rudimentary leaves secrete a sticky substance that completely coats over the entire growing point. These glands suspend their activity as the leaf matures and the secretion dries, giving the leaf a lacquered appearance. Where the leaf base attaches to the stem the glands remain active so that the axil of the leaf is filled with the secretion which serves to protect the young bud. At a later stage the leaf becomes succulent and this dried secretion falls off. Stomata are seen in all stages of their development but they are functionless at first owing to the plugging of their pores with the secretion. With the cessation of glandular activity the stomata reach their full development and become functional. Differentiation of leaf tissues is likewise belated, beginning first with the decreased activity of the glands. The mature leaf is thick and succulent due to the development of water storage tissue. No spongy mesophyll is formed, the bulk of the leaf consisting of a number of rows of palisade cells. Mucilage cells and water storage tracheids are derived from this central tissue.—*P. D. Strausbaugh.*

644. Focke, W. O. **Die nordwestdeutsche Küstenflora. [The coastal flora of northwestern Germany.]** Flora 111-112: 282–293. 1918. Discussing the general features of the vegetation, the author states that the bog formation occurs in one station only. Forest is absent, but some herbaceous members of the forest flora occur, possibly favored by the high humidity. A few calciphile species occur on shell-beds, while calciphobes are rare and of recent introduction. The drying effect of the wind is of little importance and most injury by the wind is due to the salt spray which it carries inland. Occasionally all the planted trees in a locality die simultaneously without visible external injury, and this the author believes is due to subterranean salt water. Certain non-halophytic plants limited to the seashore are probably favored by special climatic conditions of humidity and temperature.—*H. A. Gleason.*

645. Folsom, Donald. **The influence of certain environmental conditions, especially water supply, upon form and structure in Ranunculus.** Physiol. Res. 2: 209–276. *24 fig.* Dec., 1918.—The aim of this work in the words of the author is "to determine quantitatively the responses produced in the development of two plastic species (*Ranunculus sceleratus* and *R. abortivus*) with regard to certain differences in the surroundings, especially in soil-moisture content, and to determine as far as possible any correlations that may be manifest between structural differences occurring in various parts of the plant, on the one hand, and the environmental conditions, on the other." [See Bot. Absts. 2, Entry 307.]—*P. D. Strausbaugh.*

646. Gail, Floyd W. **Some experiments with Fucus to determine the factors controlling its vertical distribution.** Publ. Puget Sound Biol. Sta. 2: 139–151. *1 chart, 6 tables.* Dec., 1918.—Light is found to be the controlling factor in determining the lower limit of Fucus. With the reduction of light intensity sporelings can not survive when planted more than 3 dm. below the surface, and well grown plants at a depth of 1 m. undergo decomposition and death. Gravelly beaches are without Fucus because of the movement of the stones, and the smoothness of the latter permits of rapid and thorough drying during low tide thus preventing germination.—*P. D. Strausbaugh.*

647. Griggs, Robert F. **The recovery of vegetation at Kodiak.** Ohio Jour. Sci. 19: 1–57. *32 fig.* Nov., 1918.—The first of a series of papers setting forth the results of the Katmai Expeditions of the National Geographic Society. The eruption of Katmai in 1912 spread an ash blanket a foot in depth over the region of Kodiak a hundred miles distant from the volcano. All herbaceous vegetation was suppressed. Within three years a remarkable recovery of vegetation had taken place largely due to the revived activity of old plant parts buried beneath the ash layer. The ash contains a very small quantity of nutrient salts and possesses no "fertilizing" property as has sometimes been asserted. However it improves the physical condition of the old soil when mixed with it. The ash cover forms a very unstable bed for seedlings and they have no chance except in sheltered places. The ash is being rapidly re-

moved by the agencies of erosion and little will remain with the passing of another century. The bogs of the region were practically all destroyed and salt marsh conditions have been so modified that while a reestablishment of this feature is expected, the number of such marshes will be very much reduced. The alpine heath is beginning to reappear and a study of its reestablishment will result in a better understanding of the life conditions of an arctic alpine flora. Photographs of definitely located sites were found to be more advantageous in establishing vegetation stations than the meter quadrat method of Clements.—*P. D. Strausbaugh.*

648. OSBORN, T. G. B. **On the habitat and method of occurrence in South Australia of two genera of lycopods hitherto unrecorded for the state.** Trans. Roy. Soc. South Australia 42: 1–12. *Fig. 3, pl. 1.* 1918.—*Isoëtes Drummondii* and *Phylloglossum Drummondii* are here recorded for the first time from South Australia. The association in which both are found is described in detail; it also includes a considerable number of other geophytes. The author regards it as "a seasonal swamp developed upon alluvial soil within the formation of sclerophyllous woodland." The species of Isoëtes here reported is of peculiar interest in that it is seldom submerged.—*P. D. Strausbaugh.*

649. ROSENDAHL, C. O., AND F. K. BUTTERS. On the occurrence of *Pinus banksiana* in southeastern Minnesota. Plant World 21: 107–113. *Map.* May, 1918.—The distribution of coniferous forests in Minnesota and their component species is briefly described. The numerous stations for *Pinus Strobus* and the two stations for *P. Banksiana,* which all lie outside the coniferous forest, are described and located on a map of forest areas. The latter tree is believed to have had a more extended range, restricted by prairie fires. [Rev. by Toumey in Jour. Forestry 16: 820–821. Nov., 1918.]—*Forrest Shreve.*

650. WALL, A. **On the distribution of Senecio saxifragoides Hook. f., and its relation to Senecio lagopus Raoul.** Trans. New Zealand Inst. 50: 198–206. *Fig. 1, pl. 3.* June, 1918.—The first of these species is found only along Port Hills and the second is found exclusively on Banks Peninsula. Neither species invades the territory of the other while both occupy characteristically similar habitats—precipitous basalt cliffs. *S. saxifragoides* is the more xerophytic of the two and it is suggested that the restricted distribution of these closely related species may be explained by the difference in rainfall, the higher peaks of Banks peninsula having a greater amount of precipitation than Port Hills.—*P. D. Strausbaugh.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

651. ANONYMOUS. **Report of the Connecticut Park Commission for the two fiscal years ended September 30, 1918.** *36 p., 12 pl.* Hartford, 1919.—Since its creation in 1914 the State Park Commission has acquired 3,150 acres in 18 towns. These areas are well scattered through the State and include mountain tops, woodlands, and river, lake, and seashore frontage. The basic policy adopted by the Commission is to conserve for the entire public as much as possible of the natural beauties of the State. Special effort will be made to protect the animal and vegetable life in the areas acquired. The Commission feels that an immediate demonstration of what is meant by a State park in its largest and fullest sense is necessary, and it is urging the appropriation of sufficient funds to make this possible.—*S. T. Dana.*

652. FORSLING, C. L. **Chopped soapweed as emergency feed for cattle on southwestern ranges.** U. S. Dept. Agric. Bull. 745. Jan., 1919.—Severe droughts which occur at intervals of from three to ten years have in the past caused severe setbacks to the range cattle industry in the Southwest through the greatly reduced crop of range forage during such periods and through the lack of an economical feed as a substitute. A substitute, which is satisfactory to a large extent at any rate, has been found in soapweed (*Yucca elata*). Stock eat the leaves of the plant when other more palatable vegetation is scarce. The blooms and the growing tip in the center of the upper circle of leaves form an important forage for cattle in

late spring and early summer. Analysis has shown chopped soapweed to be comparable with native grasses and some of the poorer hay crops. The entire stem as well as the leaves can be utilized, and machines have been developed for chopping both stem and leaves into particles small enough to be eaten by cattle. As ensilage it is satisfactory, but the ensilage process is unnecessary where the soapweed is abundant. The chopped trunks or stems, which furnish the bulk of the feed, are palatable and, when fed with the chopped leaves, are readily eaten by stock without any softening process. There is no cumulative ill effect on the digestive tract of cattle fed on soapweed over a long period. Neither is there any harmful purgative effect from the soapweed, except occasional scouring when feeding is continued after the sap begins to rise in the plant. On the contrary, the soapweed tends to keep the digestive tract of the animal in good condition. It is possible that the occasional scouring effect may be overcome by delaying the chopping of the plants into feed until they have been allowed to dry out for several days after the dry leaves are burned. Soapweed is slow-growing, occupies a soil highly subject to wind erosion, and is a protection to stock, so that it is advisable to use the plant only as emergency feed. Only the larger plants should be selected for cutting, the smaller ones being left to protect the soil. Occasional plants tall enough for the blooms to be out of the reach of cattle should be left for seed plant and as a protection for stock. Small soapweed or bear grass (*Yucca glauca*), and sacahuista (*Nolina microcarpa* and *N. erumpens*) are somewhat similar to the soapweed, the small soapweed being found slightly farther north. It is possible that the greatest use of these plants for feed will be as ensilage. [See Bot. Absts. 3, Entry 180.]—*G. A. Pearson.*

653. Hesselmann, Henrik. **Om vara skogsföryngringsatgarders inverkan pa salpeterbildningen i marken och dess betydelse for barraskogens föryngring. [Influence of silvicultural practice on nitrification of the soil and its importance in the reproduction of coniferous forests.]** Skogsvardsfören. Tidsskr. **16**: 1–104. 1918.—For several years Hesselman has been studying the pine heaths of northern Sweden where reproduction is especially difficult. Early investigations convinced him that the difficulty could not be attributed to lack of moisture. He therefore turned his attention to chemical conditions in the forest floor. Where reproduction is lacking, its failure is generally attributed to the fact that under certain conditions the organic matter of the forest floor is not converted into available nitrogen. These conclusions are based upon numerous chemical analyses of soils and plants under different forest conditions. Two general classes of forest soils are recognized. In one the transformation of organic matter into available nitrates is complete, while in the other, the process stops with the formation of ammonia. To the latter class belongs the bulk of the Swedish forests, namely, all the coniferous forests bearing heavy growths of moss and lichen. In forests of this type, clear cutting or even thinnings may bring about lively nitrification. The same result may be accomplished by cultivation in which the humus is mixed with mineral soil, even in closed stands. Decaying brush or logs also favor nitrification. If the layer of raw humus is very thick, cutting alone may not suffice to bring about nitrogen formation, although the production of ammonia is increased. Under such conditions, nitrification is hastened by cultivation or burning. Where large openings are made, the increased nitrogen supply together with increased light may favor herbaceous growth to the detriment of forest reproduction.—*G. A. Pearson.*

654. Jolyet, A. **Cabanes à Chauves-souris.** [Shelters for bats.] Rév. Eaux et Forets **1918**: 121–126. June, 1918. [Through abst. by S. T. Dana in Jour. Forestry **16**: 936–937.] Systematic breeding of bats as insect destroyers for use in the war-damaged timber is proposed. These animals are recommended because they take insects in the adult stage and so do not destroy the parasites. *Vesperugo* is the genus recommended.—*E. N. Munns.*

655. Pearson, R. S., and Puran Singh. **Preparation of turpentine, rosin and gum from Boswellia serrata (Roxb.) gum-oleoresin.** Indian Forest Rec. **6**^{6}: 303–345. 1919.—Field and laboratory investigations were conducted over a period of five years (1908–1912), to determine the best method of obtaining crude gum-oleo-resin of *Boswellia serrata*, and also of sep-

arating its chief components, gum, rosin and turpentine. The investigations also determined the number of trees available in Indian government forests for exploitation. Eighteen different species of the genus *Boswellia* (Burseraceae) are known to science, most of which grow in tropical Africa and India. *Boswellia* yields its gum-oleo-resin only from the living bark when the latter is scarified, the resin quickly congealing when exposed to the air. The crude product has long been known and locally used in India as a frankincense and for medicinal purposes, and it is said to be equal in quality as a substitute for the Arabian and African frankincense. This is a medium to large sized, deciduous species, with thin scaly bark, common on the driest and most exposed slopes of hills throughout India, where it often forms pure open forests. The 24 different government forest divisions contain 42,694,016 trees suitable for tapping, an average of 1,777,917 trees to each forest division. Expressed in terms of the American turpentine "crop" (8000 to 10,000 trees), this number would amount to from 4269 to 5336 "crops." Tapping of *Boswellia serrata* consists in blazing or shaving off a 6-inch-wide girdle of living bark to a depth of about half the thickness of the bark, at a height from the ground of from 2 to 2½ feet. The wound is freshened at intervals of from 4 to 6 days by shaving off a very thin layer of bark from the old blaze and also about 1 inch of the new bark on the upper edge of the wound. The hardened gum is scraped from the wound with a dull knife before each retapping operation. The average yield per tree per year is about 2¼ pounds, the annual yield from 8000 to 10,000 trees amounting to from 18,000 to 22,500 pounds. The turpentine is obtained by steam distillation of the mass, the total yield being approximately 7 per cent, or from 157 to 197 gallons, and the remaining yield consists of nearly equal proportions of resin and gum, which are separated by means of solvents. Tapping is begun in November and terminated within 5 or 6 months, and the period during which the trees can be profitably worked is about 5 or 6 years. Investigations showed that continuous tapping for this period is not advisable, but that each year's tapping should be followed by 2 years' rest, fixing the rotation at 3 years. The effect of the tapping on the vitality of the trees is said not to be serious, for all of the wounds become completely healed. Owing, however, to the exceedingly uneven surface of the healed trunks it would seem very difficult, if not entirely impracticable, to again work these trees. Eighty-nine per cent of the turpentine from *Boswellia serrata* is distilled at temperatures of from 153° to 160°C., while 85 per cent of American turpentine distils between 155° and 163°C., and from 85 to 90 per cent of French turpentine passes over between 155° to 165°C. The general statement is made that *Boswellia* turpentine, consisting mainly of dextropinene, is as good as the best American and French turpentines. It dissolves colophony, dammar, sandarac, and soft copal, as readily as do pine turpentines. Varnishes made with it are practically identical with those made with pine turpentines, the important difference being that *Boswellia* varnishes dry more rapidly than others and have a uniformly dull "face," while varnishes made with American turpentine remain bright. As a substitute for the American product *Boswellia* turpentine would be placed between the French or Spanish and the Swedish or Russian oils. *Boswellia* rosin, similar in physical characteristics to pine rosins, can be used for all of the purposes to which pine rosins are put, except for soap making. *Boswellia* gum, in appearance not unlike gum arabic, is likely to be useful mainly for the manufacture of sizing for textiles, etc., but owing to the lack of complete solubility in water due to the presence of resin, it can not be used for these purposes without special treatment.—*Geo. B. Sudworth.*

GENETICS

George H. Shull, *Editor*

656. Babcock, E. B., and J. L. Collins. **Genetics laboratory manual.** First edition. *15.5 × 24 cm., xi + 56 p., 14 fig.* McGraw-Hill Book Co. Inc.: New York. 1918. Rev. by L. J. Cole in Jour. Hereditary 10: 19–40. Jan., 1919.

657. Barker, E. Eugene, and R. H. Cohen. **Variability in the radish.** Jour. Heredity 9: 357–361, 384. *Fig. 10.* Dec., 1918.—Aim of study was to determine more exactly the

amount of variability in a representative kind of root vegetable, and also what genetic factors most affect yield. Four hundred seeds each, of three varieties, were used, two of which were supposed to be alike at time of maturity. Marked variation was found with respect to vitality of seed, marketable quality of roots and trueness to type, the latter character of which was shown statistically. Authors attribute these undesirable variations to improper seed selection, and particularly to mass selection. Methods for improvement by selection are suggested.—*C. E. Myers.*

658. Castle, W. E. **Is the arrangement of the genes in the chromosome linear?** Proc. Nation. Acad. Sci. U. S. Amer. 5: 25–32. *2 fig., 1 diagram.* Feb., 1919.—On the assumption that the crossover percentages shown by any two pairs of genes are *exactly* proportional to their distances apart, Castle proposes an arrangement in three dimensions instead of the familiar linear series. He believes that this scheme gives more exact agreement of observation and expectation for large crossover values (long "distances"). Certain difficulties with respect to the smallness of the "double crossover" class are mentioned, and a subsidiary hypothesis to account for them is proposed.—*A. H. Sturtevant.*

659. Castle, W. E. **The linkage system of eight sex-linked characters of Drosophila virilis (data of Metz).** Proc. Nation. Acad. Sci. U. S. Amer. 5: 32–36. *Fig. 3–4.* Feb., 1919.—This applies to *D. virilis*, author's three dimensional arrangement of linked genes. [See preceding abstract.] Several predictions are made, as to the crossover values to be expected from certain untried combinations. For instance, glazed-rugose is put at 4 or 5 per cent or probably a little greater.—*A. H. Sturtevant.*

660. Classen, K. **Vererbung von Krankheiten und Krankheitsanlagen durch mehrere Generationen. [Heredity of diseases and of disease tendencies during several generations.]** Arch. Rassen- u. Gesellschaftsbiol. 13: 31-36. 1918.

661. Cockerell, T. D. A. **The varieties of Helianthus tuberosus.** Amer. Nat. 53: 188–192. *2 fig.* Mar.–Apr., 1919.—The Jerusalem artichoke has been in cultivation more than three hundred years. It is a native of North America, and was used as food by Indians in pre-Columbian times. Has secured little attention from breeders, is enormously prolific, and tubers are excellent food for man and beast. Recent experiments indicate that it may be an important source of sugar, in the form of syrup. Tops can be used as fodder. For these reasons, author believes it to be desirable to investigate the existing varieties and record principal characteristics.—He describes seven named varieties which differ widely in a number of characteristics. Cultivated forms produce larger tubers than the wild forms; and some varieties yield twelve pounds to a plant. Suggests possibility of crossing to improve type and size. Distribution of anthocyanin is variable in the different varieties.—*C. E. Myers.*

662. Cockerell, T. D. A. **Hybrid perennial sunflowers.** Bot. Gaz. 67: 264–266. Mar., 1919.

663. Cole, Leon J., and William A. Lippincott. **The relation of plumage to ovarian condition in a Barred Plymouth Rock pullet.** Biol. Bull. 36: 167–182. *2 pl.* Mar., 1919.—Description of changes in plumage in a hen, associated with development of an ovarian tumor. The change was made from the female plumage to that of a male. Following implantation of normal ovary, there was a reversal of plumage development. Special attention is called to width of bars as a secondary sexual character *not* affected by ovarian secretions.—*H. D. Goodale.*

664. Collins, J. L. **Chimeras in corn hybrids.** Jour. Heredity 10: 3–10. *6 fig.* Jan., 1919.

665. Cook, O. F. **Evolution through normal diversity.** Jour. Washington Acad. Sci. 9: 192–197. Apr. 4, 1919.

666. DANFORTH, C. H. **The developmental relations of brachydactyly in the domestic fowl.** Amer. Jour. Anat. 25: 97–116. *5 fig.* Mar. 15, 1919.—See Bot. Absts. 3, Entry 31.

667. DAVENPORT, CHARLES BENEDICT, ASSISTED BY MARY THERESA SCUDDER. **Naval officers, their heredity and development.** Carnegie Inst. Washington Publ. 259. *236 p.* 1919.—See Bot. Absts. 3, Entry 246.

668. EDWARDS, F. W. **Some parthenogenetic Chironomidae.** Ann. Mag. Nat. Hist. 3: 222–228. Feb., 1919.—Females emerging from isolated pupae of *Chironomus clavaticrus* and *Corynoneura innupta* (a new species) deposited eggs which developed parthenogenetically. Offspring were females in all cases. Males are unknown in both species. Author finds only two other recorded cases of parthenogenesis in Chironomidae, in *Tanytarsus boiemicus* and *Corynoneura celeripes*, and in each case offspring were females. Speculates briefly on origin of parthenogenesis.—*A. Franklin Shull.*

669. ELMIGER, J. **Über schizophrene Heredität. [On heredity of schizophreny.]** Psych.-neurol. Wochenschr. 19: 31–34. 1917–1918. [Through abst. by KURT MENDEL in Neurol. Centralbl. 1918: 760. Nov., 1918.]—Summary asserts (1) that "indirect" heredity of schizophreny plays four times as important a rôle as "direct" heredity; (2) that indirect heredity can be proved in 8 per cent of the non-schizophrenous psychoses; (3) that direct tainting with structural abnormalities and mania for drinking occurs about equally in schizophrenous psychoses; (4) that marriages in which one party is schizophrenous average fewer children than normal marriages; (5) that marriages with both parties schizophrenous are rarities; (6) that average proportion of healthy to sick sibs was 2.5 to 1; (7) that schizophreny is transmitted as a recessive.—*J. P. Kelly.*

670. GATES, WILLIAM H. **Another hen that crowed.** Jour. Heredity 9: 343–347. *6 fig.* Dec., 1918.—An interesting instance of a hen that assumed complete male characters, associated with cystic degeneration of the ovaries. History of the bird is of particular importance, because she not only assumed plumage, spurs and head gear of male, but also assumed his habits: crowing, giving the characteristic male call for food, and treading hens. In habit, then, she differed from hens from which the ovary has been removed, since such birds lack these reactions, though normal hens occasionally exhibit them.—*H. D. Goodale.*

671. GREGOR, ADALBERT. **Rassenhygiene und Jugendfürsorge. [Race hygiene and the care of youth.]** Arch. Rassen- u. Gesellschafts-biol. 13: 37–55. 1918.

672. GUTHERZ, S. **Zur Lehre vom Ursprung der tierischen Keimzellen. [To the doctrine of the origin of the animal germcells.]** Arch. Mikrosk. Anat. 92^2: 1–40. *2 pl., 1 fig.* 1918.

673. HALSTED, BYRON D. **Possible correlations concerning position of seeds in the pod.** Bot. Gaz. 67: 243–250. Mar., 1919.

674. HARRIS, F. S. **The sugar-beet in America.** *13 × 19 cm., v + 342 p., 31 pl., 38 fig.* Macmillan Co.: New York. Jan., 1919.—Chapter 5 (p. 213–230) discusses production of sugar-beet seed, dealing chiefly with cultural and commercial problems, but pointing out evidences of great hereditary diversity in beet populations, and importance of developing distinctive strains especially suited to American conditions. Attempt to produce variety with single-germ seed (as carried on by U. S. Department of Agriculture) made some progress, but results were not altogether satisfactory and this work was abandoned. Single-germ seed is desirable, but may not be possible of attainment. Discussion of improvement by selection is very brief and contains nothing new.—*G. H. Shull.*

675. HEAL, JOHN. **Hybridization and cross-fertilization of flowers.** Gard. Chron. 65: 25–26. *Fig. 9.* Jan. 18, 1919.—Popular account of author's experiments in hybridization. List is given of large number of interspecific hybrids. In case of *Begonia* these are divided up into those which resemble female and those which resemble both parents. [See Bot. Absts. 2, Entry 713.]—*M. J. Dorsey.*

676. Hegner, R. W. **Variation and heredity during the vegetative reproduction of Arcella dentata.** Proc. National Acad. Sci. U. S. Amer. 4: 283–288. Sept., 1918.—By study of progeny of 171 "wild" specimens it was found that (a) variations in spine number occurred among descendants of single specimens during fission and were in part inherited, (b) "wild" population consists of large number of heritably diverse families so far as spine number is concerned. —Author next attempted to isolate heritably diverse lines from among descendants of a single specimen, produced by vegetative reproduction. During 39 days before selection was begun among descendants of individual chosen as parent, 7 generations totaling 198 specimens were obtained with mean spine number of 10.87. Then selection was carried on for 64 days during which 22 generations totaling 1192 specimens were reared. During 6 successive portions of this 64-day selection period differences between mean spine numbers of high and low line were: —0.07, 0.50, 0.40, 0.48, and 1.16. Mean difference was 0.55.—Now followed 35 days of no selection during which 18 generations totaling 1325 specimens were reared. Differences for 4 successive portions of this no-selection period were 0.94, 0.07, 0.41, 0.43 and mean difference was 0.46.—Then he attempted to break low line into high and low portions. During 23 days of selection average difference in mean spine number of two divisions of ex-low line was 0.30. During a succeeding non-selection period of 11 days this average difference was 0.44. Thus two lines heritably diverse in spine number were isolated among the descendants of this low line. Similar results were obtained with respect to diameters. At least 2 apparent "mutations" occurred in low line. Small individual having 8 spines and 27 units diameter appeared in this line, but its progeny of 4th generation had regained diameter and spine number of low line. Progeny of other apparent "mutation" had mean spine number of 9.91, mean diameter of 23.51 units; mean spine number of its parent low line was 10.99, mean diameter 27.05 units, giving difference in mean spine number 1.08, and in mean diameter 3.54 units. These differences persisted; therefore this specimen was a sudden large variation that was inherited, i.e., a "mutation." Descendants of this mutant were most variable set studied.—Hence among numerous progeny of single specimen of *Arcella dentata*, produced by vegetative reproduction, are many heritably diverse branches due to slight variations and sudden large variations ('mutations'). This appears a true case of evolution observed in laboratory and occurring similarly in nature.—*A. R. Middleton.*

677. Hertwig, Oskar. **Das Werden der Organismen. Zur Widerlegung von Darwin's Zufallstheorie durch das Gesetz in der Entwicklung. [The origin of organisms. Refutation of Darwin's theory of chance, through law in evolution.]** 2nd enlarged and improved ed. *8 vo., xviii + 680 p., 115 fig.* 1918. [From Publisher's announcement in Zoöl. Jahrb. 41: cover page 3. 1918.]—Author considers older theories of reproduction, position of biology as regards vitalistic and mechanistic conceptions of life, theory of the "specific cell" (Artzelle") as basis for origin of living creatures and genesis of many-celled organisms from "specific cells;" biogenetic law; maintenance of life processes through successive generations; classification; question of constancy of species; position of organisms in mechanism of nature; present standpoint of heredity; history of theories of descent; Lamarckism and Darwinism; critique of theory of chance, and selection.—*J. P. Kelly.*

678. Ibsen, Heman L. **Synthetic pink-eyed self white guinea-pigs.** Amer. Nat. 53: 120–130. *5 fig.* Mar.–Apr., 1919.

679. Ikeno, S. **Zikken-Idengaku.** [A text-book on genetics] (Japanese). 3rd ed., rewritten and augmented. *22 × 14.5 cm., 230 p., 8 pl. 38 fig.* Nippon-no-Rômazi-Sya: Tôkyô, 1918. Price, 2 yen 80 sen [$1.40].—Third edition of an elementary text-book on genetics, first published in 1913 and written in Romanized Japanese. It consists of short introduction, and three parts: Hybridization, Variation, and an Appendix; illustrative examples are mainly taken from Japanese investigations. In Part I (p. 5–110), after description of various kinds of hybrids, methods of investigation, and history of hybridization experiments since Kölreuter, comes discussion of monohybrids, back-crossing and use of mean error for testing goodness of fit of Mendelian results being explained on them. Then follows description of

di-,tri- and polyhybrids. Presence and absence hypothesis is discussed in one whole, though short, chapter. Appearance of new characters by hybridization, epistasy and hypostasy, polymery, linkage, xenia, and non-Mendelian hybrids, etc. form subjects of another chapter. Still another chapter contains results of hybridization experiments with rice pursued by Dr. Katô. The hereditary behavior of some characters of this plant, which has remained undescribed till now, at least in any European language, is noticed below, each pair of characters mentioned being allelomorphic, the first one of each pair being dominant: awn (or apical part of palea, if awn is absent) red vs. colorless; palea brown vs. colorless; palea colorless vs. yellow; stigma purple vs. colorless; grains red vs. white; ripe grains not readily falling from axis vs. falling off very easily (as, for instance, by light wind); susceptibility to disease caused by *Leptosphaeria Cattanei* vs. immunity from it; all these characters segregate in F_2 in typical 3 : 1 ratio. Some quantitative characters were also studied: thus, in the hybridizations, high × low stature, long × short panicle, thick × thin stem, the first-named characters being always perfectly or almost perfectly dominant towards the second; while in compact × loose arrangement of grains and broad × narrow leaf, the F_1 hybrid lies intermediate between the two parents; in respect to time of the appearance of first panicle, as well as amount of tillering, the F_1 hybrid belongs to second class given above. Mode of segregation of all these quantitative characters is very complex, owing without doubt to presence of multiple factors, and has not been completely studied. In next chapter, which is concerned with heredity of mankind, normal characters, as eye-color, skin-color, shape and color of hairs, etc., as well as teratological ones, as brachydactyly, etc., and diseases, are discussed.—Part II (p. 111–170), devoted to variations, is divided into two chapters. In that relating to non-heritable variations, fluctuations come first, their general laws, causes, variation-curves and biometrical constants being explained. Pure line theory of Johannsen is explained by means of illustrative instances, both from plants and animals. Modification due to external influences is also described, and non-inheritability of acquired characters is discussed. In chapter relating to heritable variations, mutations, bud-variations, famous experiments of de Vries on Oenothera, and variations by combinations come in order.—The appendix (p. 173–220) contains Japanese translation of Mendel's paper on peas.—*S. Ikeno.*

680. Ikeno, S. **On hybridization of some species of Salix.** Jour. Genetics 8: 33–58. *1 pl. 1 fig.* Dec., 1918.—Reference is made to Wichura's *Salix* hybrids breeding true in generations beyond F_1. Experiments conducted with few species show this is not always the case with respect to certain characters. Growth habit of stem, pubescence of leaves, color of stigma, all show segregation in F_2 but no definite Mendelian ratios were obtained. Stipulation of leaves is variable on F_1 plants, some leaves with stipules, others without on the same plant, or even the two halves of the same stem may differ in this respect. Segregation of this character in F_2 is not proved. *Salix purpurea multinervis* × *S. gracilistyla* gave two types of individuals with catkins resembling one or the other parent. When like F_1 types of each of the two kinds were crossed together many of the same type of catkin and few of the opposite type were produced. When different types were mated approximate equality of the different types were secured in the offspring. In two of these matings a new type of catkin appeared. Both parents bred true for catkin type in one generation tested, 70 and 100 individuals having been grown. Several hypotheses are considered. Of these the most probable assures one or both of parents heterozygous for indivisible factors not affecting the catkin type in the parental combination in which they occur. Thus the appearance of the two types of catkins in F_1 is not due to segregation of the main catkin factors themselves and all individuals in F_1 agree in carrying these in heterozygous condition. Their segregation was found to take place in F_2, the peculiar method of this segregation is explained on the basis of the subsidiary factors. The same cross repeated one year later between the same female individual and either the same individual male or from the same clonal line gave a different result in that no twin hybrids were produced but all the progeny (nearly 50 individuals) were of purely maternal type and all of the same sex. Literature on "false hybrids" (pseudogamy, merogony) is reviewed. Table of successful and unsuccessful hybridizations of various species of *Salix* is appended.—*D. F. Jones.*

681. Key, Wilhelmine E. **Better American families.** Jour. Heredity 10: 11–13. Jan., 1919.

682. Kezer, Alvin, and Breeze, Boyack. **Mendelian inheritance in wheat and barley crosses, with probable error studies on class frequencies.** Colorado Agric. Exp. Sta. Bull. 249. *139 p., 9 pl., 10 fig.* Oct., 1918.—Red and white chaff and beardlessness and beardedness were studied in wheat and gave the usual monohybrid ratios; when two characters were studied together the dihybrid ratio was obtained. Wheat crossed with emmer showed F_1 intermediate. In F_2 pubescence and black glume always occurred together. Hooded and beardless barleys gave 3 hooded:1 bearded. White six-rowed × black two-rowed gave 9:3:3:1 with black and two-rowed dominant. Black two-rowed, bearded, crossed with white six-rowed, hooded, gave the usual ratio obtained with three factors. Cross between California six-rowed and Hanna two-rowed, gave F_1 with six rows of kernels and two rows of beards. This is an exceptional case and is peculiar to this cross. Tables showing behavior of F_2 and F_3 with probable errors are given. Many colored illustrations are given. Tables giving expected class frequencies for mono-, di- and trihybrid ratios for numbers up to 500 are given. Tables for the probable errors for mono-, di- and trihybrid ratios are given in numbers for populations up to 500.—*H. H. Love.*

683. Legrand, L. **The collocation of plasmas within the cell. II.** Sci. Amer. Suppl. 85: 60–64, 76, 77, *24 fig.* 1918.—Diagrams illustrate conception of distribution of plasmas in fertilized egg, in form of concentric regions overlapping one another in various patterns and thus presenting wide range of variation in interrelated surface contacts. According as arrangements vary so do regions become active in different degrees or even remain latent. Similarly plasmas in paternal and maternal chromosomes by sliding and twisting movements of chromosomes become associated in different ways and to different degrees or even may be prevented from coming into contact.—*B. M. Davis.*

684. Lenz, Fritz. **Über dominant-geschlechtsbegrenzte Vererbung und die Erblichkeit der Basedowdiathese. [Dominant sex-linked heredity and the inheritance of the Basedow diathesis.]** Arch. Rassen- u. Gesellschaftsbiol. 13: 1–9. *5 fig.* 1918.

685. Little, C. C. **A note on the fate of individuals homozygous for certain color factors in mice.** Amer. Nat. 53: 185–187. Mar.–Apr., 1919.

686. McArthur, Clifford L. **Transmissibility of immunity from mother to offspring in hog cholera.** Jour. Infect. Dis. 24: 45–50. Jan., 1919.—Investigators have previously noted that immune mothers produce pigs possessing some immunity to hog cholera. However most of sows used had passed through an outbreak of the disease and had not been subjected to the Dorset-Niles method. Author's experiments were carried on with sows rendered immune by Dorset-Niles anti-hog cholera serum with virus. Results of six sets of experiments indicate that pigs of sows immunized against hog cholera by Dorset-Niles method secured and retained immunity as long as they were sucklings, unless sow lost her immunity. In most cases it appeared that immunity of pigs lasted a few weeks after weaning. Second litters appeared, for most part, to be more highly immune while sucklings than first litter. Although exact method of transmission of antibodies is not known, indications are that they are transmitted through the milk.—*R. K. Nabours.*

687. MacCaughey, Vaughan. **Race mixture in Hawaii.** Jour. Heredity 10: 41–47. Jan., 1919.

688. MacDougal, D. T. **Culture of a potato hybrid, Solanum Fendleri × S. tuberosum ("Salinas").** Carnegie Inst. Washington Year Book 17: 87–88. 1918.

689. McRostie, G. P. **Inheritance of anthracnose resistance as indicated by a cross between a resistant and a susceptible bean.** Phytopathology 9: 141–148. Mar., 1919.—Object was to study inheritance of resistant factors of bean anthracnose, and also to secure a com-

mercial type of white bean resistant to the disease.—Wells' Red Kidney, a bush bean, resistant to both strains of *C. Lindemuthianum* was used as one parent. The other parent was a selection of Michigan Robust, a white bean, resistant to one strain of the anthracnose, but very susceptible to the other. Reciprocal crosses were made. The F_1 were vigorous-growing pole-bean types, heavily podded. Seeds were intermediate in size and shape, dark navy blue to black. The F_2 showed a great variety of types, but the 3:1 ratio was observed in color and habit of growth.—Seedlings of the F_2 plants were inoculated artificially. Ten days later resistant ones were transplanted to the field. Different families varied in resistance and many showed close approximation to the 3 : 1 ratio, with resistant character dominant. Similar results were observed in the F_3. Author notes that "the ratios obtained throughout between resistant and susceptible plants indicate quite clearly a single factor difference between resistance and susceptibility to the one strain of anthracnose concerned in the cross. The fact that resistance is dominant makes it more difficult to secure resistant types from the F_2 segregations, as it is necessary to grow all resistant F_2 plants through to the F_3 generation in order to tell whether they are homozygous or heterozygous for resistance."—*C. E. Myers.*

690. Meves, Friedrich. **Die Plastosomentheorie der Vererbung. Eine Antwort auf verschiedene Einwände. [The plastosome theory of heredity. An answer to various criticisms.]** Arch. Mikrosk. Anat. 92: 41–136. *18 fig.* 1918.

691. Miyazawa, B. **Studies of inheritance in the Japanese Convolvulus.** Jour. Genetics 8: 59–82. *Pl. 2, 1 fig.* Dec., 1918.

692. Nabours, Robert K. **Parthenogenesis and crossing-over in the grouse locust Apotettix.** Amer. Nat. 53: 131–142. Mar.–Apr., 1919.—Females of *Apotettix* when kept in isolation, or when placed with males of another genus with which, apparently, they are unable to copulate, may produce offspring parthenogenetically. Crosses involving color patterns indicate that even when female mates some of her offspring may be parthenogenetically produced. Of the parthenogenetically produced offspring, 4470 have been females, 7 males. Diploid (oögonial) number of chromosomes appears to be 14, while in female produced parthenogenetically 9 whole chromosomes and some fragments were found in one somatic cell. Author suggests that egg develops parthenogenetically, or not at all, when sperm enters late.

Segregation occurs in eggs that develop without fertilization, as in other eggs. Crossing-over is demonstrated in eggs that develop parthenogenetically, as in other eggs, in amounts ranging from zero to 12 per cent. The occurrence of *AA* forms as result of cross-over may in part explain greater abundance of these forms in nature.—*A. Franklin Shull.*

693. Newman, C. C., and L. A. Leonian. **Irish potato breeding.** South Carolina Agric. Exp. Sta. Bull. 195. *28 p., 19 fig.* June, 1918.—In South Carolina the Lookout Mountain potato (*Solannm tuberosum*) produces abundance of seed balls every year. The writers are attempting to secure potato that can be propagated by seed instead of by tuber cuttings. Data are presented showing that in plants producing seed there is no reduction in yield of tubers. Report covers first season's results with 5000 seedlings of Lookout Mountain. Seedlings were started in greenhouse, set in field in April, and harvested as tops died. The plants varied in size and habit of growth; some seedlings had 3 or 4 cotyledons. Yield of tubers and date of maturity were made basis of classification. Tubers varied in color from white to brown and to pink. On some plants both white and pink tubers occurred. Only 1900 plants produced an ounce or more of tubers, and only 64 yielded a pound or more, these few comparing favorably with yields of individual plants grown from tuber cuttings.—*John W. Bushnell.*

694. Norton, J. B. **Washington asparagus: information and suggestions for growers of new pedigreed rust-resistant strains.** United States Dept. Agric. Circ. 7. *8 p.* Feb., 1919.—See Bot. Absts. 3, Entry 655.

695. Olson, P. J., C. P. Bull, and H. K. Hayes. **Ear-type selection and yield in corn.** Minnesota Sta. Bull. 174: 1–60. *9 fig.* 1918.—See Bot. Absts. 3, Entry 277.

696. Pearl, Raymond. **On the mean age at death of centenarians.** Proc. Nation. Acad. Sci. U. S. Amer. 5: 83–86. *1 fig.* Mar., 1919.

697. Pearson, K., and A. W. Young. **On the product-moments of various orders of the normal correlation surface of two variates.** Biometrika 12: 86–92. Nov., 1918.—Mathematical theory of the normality of correlation. Illustrations are provided.—*J. A. Harris.*

698. Punnett, R. C., and the late Major P. G. Bailey. **Genetic studies in rabbits. I. On the inheritance of weight.** Jour. Genetics 8: 1–25. *12 fig.* Dec., 1918.—A preliminary study of growth and its heredity in rabbits. Crosses were made between the large Flemish Giant and smaller breeds. The average weight in F_1 was intermediate. In F_2, there was a shifting of the average toward that of the smaller breed. Variation was great in both generations. The authors consider the chief point of interest, in this phase of the experiment, to be the failure of the large form to reappear in F_2 in certain of the crosses.—The character of the growth curve is discussed at some length. While there seems to be some tendency for large breeds to mature late, a study of the crossbreds shows that a given final weight may be associated with almost any age of maturity within the limits found in the investigation.—*Sewall Wright.*

699. Punnett, R. C. **Note on the origin of a mutation in the sweet pea.** Jour. Genetics 8: 27–31. *1 fig.* Dec., 1918.

700. Ritchie-Scott, A. **The correlation coefficient of a polychoric table.** Biometrika 12: 93–133. Nov., 1918.—A considerable number of methods are now available for determining the coefficient of correlation between two characters from a table of frequencies. Each of these has its own special appropriate field of usefulness, and the one to be selected will depend upon nature of measurements or observations, or of distribution of frequencies, under consideration. This paper deals with the mathematical theory of the calculation of correlation in cases in which each of the two characters is distributed into three groups.—*J. A. Harris.*

701. Roberts, Herbert F. **An early paper on maize crosses.** Amer. Nat. 53: 97–108. *2 fig.* Mar.-Apr., 1919.—Author expresses belief that work of McCluer (McCluer, George W. **Corn crossing.** Illinois Agric. Exp. Sta. Bull. 21, 1892) has not been adequately appreciated by later investigators and maintains that McCluer shows inherent instincts of a geneticist although this paper far antedated the days of pure lines, Mendelism and factorial analysis. Attention is called especially to such important observations of McCluer as superiority of F_1 hybrids in point of yield, vigor and uniformity, when compared with their parents; inferiority in yield of F_2 segregates as compared with the F_1; inferiority in size, vigor and yield of plants, as well as increased number of barren plants, abortive tassels, and poorly filled ears, on plots planted with self-fertilized seed as compared with plots planted with crossed seed or seed from open fertilized plants; general observations on the inheritance of purple aleurone, yellow endosperm, and starchy and sugary endosperm, together with recommendations for breeding of corn by farmers.—*C. B. Hutchison.*

702. Robertson, T. Brailsford, and L. A. Ray. **Experimental studies on growth. X. The late growth and senescence of the normal white mouse and the progressive alteration of the normal growth curve due to inbreeding.** Jour. Biol. Chem. 37: 377–426. *8 fig.* Mar., 1919.

703. Salisbury, E. J. **Variation in Eranthis hyemalis, Ficaria verna, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth.** Ann. Bot. 33: 47–79. *20 fig.* Jan., 1919.—A record of observation on structure of indefinite flowers. In 360 flowers of *Eranthis hyemalis* number of perianth parts ranged from 5 to 9, with majority having 6; increase in number over 6 interpreted as usually due to fission of perianth primordia and not to transformation of nectaries or stamens. In 300 flowers number of nectaries varied from 4 to 12 with mode at 6; increase up to 12 thought due to bifurcations among

six nectaries usually present. Androecium in 300 flowers gave multimodal curve with 18 as lowest number of stamens, 30 as most frequent number, and with high modes at 24 and 27. Curve for gynaecium shows minimum number to be 3 carpels with 6 as most common condition. In general, *Eranthis hyemalis* exhibits trimerous tendency. Increase of one type of organ does not take place at expense of another kind. Correlation tables show that stamens and nectaries or stamens and carpels, or nectaries and perianth parts tend to vary at same time and in same direction. There occurred transitional conditions between involucral bracts and perianth segments; bright-colored bracts are rare but bract-like perianth parts are more common; since reversionary variations are more frequent than progressive ones, author thinks perianth in *Eranthis* has evolved from bracts; moreover in no case was perianth part replaced by nectary. In *Ficaria verna* androecium and gynaecium show marked multimodal seriations with maxima chiefly at multiples of three. Four hundred of 514 flowers had 3 sepals. Tables reveal a correlation (positive) in *Ficaria* between number of stamens and carpels, and between petals and stamens; and augmented corolla must not be attributed to staminal transformation. Data few for *Anemone nemorosa* but here also was a tendency to give maxima at multiple of three and positive correlation between stamens and perianth parts. Author believes early Ranunculaceous type was flower of alternating trimerous whorls with pentamerous condition derivative. [See Bot. Absts. 2, Entry 749.]—*J. P. Kelly.*

704. SCHALLMAYER, W. **Vererbung und Auslese. Grundriss der Gesellschaftsbiologie und der Lehre vom Rassedienst. [Heredity and selection. Fundamentals of social biology and science of race improvement.]** 3rd ed. *8vo, xvi + 536 p.* Gustav Fischer: Jena, 1918. [Through Publisher's announcement in Zoöl. Jahrb. 41: cover p. 2. 1918.]—In part 1 author takes up scientific basis of race improvement starting with discussion of theory of evolution and present teachings on heredity and variation, especially with reference to man; necessity for application of principles to race improvement; decline and extinction of peoples and problem of degeneration, observations on oldest existent civilized nation and sociological problem of aim and evaluation of state policy. Part 2 treats of aims and methods of race increase and of general eugenics. By fundamental revision, and condensation of matter of previous editions, and addition of new material, this third edition becomes almost a new book.—*J. P. Kelly.*

705. SCHULTZ, WALTHER. **Versteckte Erbfaktoren der Albinos für Färbung beim Russenkaninchen im Soma dargestellt und rein somatisch zur Wirkung gebracht. [Hereditary color factors hidden in albino Russian hares, demonstrated in the soma, and purely somatically activated.]** Zeitschr. Indukt. Abstamm. Vererb. 20: 27–40. *9 fig.* Sept., 1918.

706. SHAMEL, A. D. **Bud variation in dahlias.** Jour. Heredity 9: 362–364. *Fig. 11–12.* Dec., 1918.—More than three thousand varieties are known to florists. Author believes many of these originated as bud variations. Variations of this kind were recognized as early as 1832. Author describes and illustrates a plant which bears three kinds of flowers, pure white, purple, and mixed white and purple. In some of the mixed flowers some of the petals are almost exactly half white and half purple. Plant has shown similar variability for five years. —*C. E. Myers.*

707. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. **Citrus fruit improvement: A study of bud variation in the Washington navel orange.** United States Dept. Agric. Bull. 623. *146 p. 19 pl., 16 fig.* 1918.—Detailed study of bud variation in the Washington Navel orange, (*Citrus sinensis* L) Osbeck. Authors have recognized many distinct strains which they have succeeded in isolating through bud selection. Fourteen of these strains have been named and described. These differ widely, not only in character of fruit, but also in type of foliage and habit of growth. Only 5 of the 14 are of possible commercial value, the others being detrimental from the orchardist's standpoint.—In addition to these 14 strains, numerous minor variations including chimeras have been found, and in a census of the bearing orchards of California, the lowest percentage of off-type trees was found to be 10, while the highest was 75 per cent. In younger orchards an even higher percentage of diverse types is

found, indicating that prevailing methods of propagation are resulting in rapid deterioration of the variety. To obviate this, authors recommend propagation only of trees which have proved valuable in performance-record tests and they urge further the use of fruit-bearing bud wood with representative fruits attached.—Individual performance records are given of 64 trees extending over a period of four years. These records show conclusively that off-type fruits are produced by certain trees. [See two following Entries, 708, 709.]—*J. H. Kempton.*

708. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: A study of bud variation in the Valencia orange.** United States Dept. Agric. Bull. 624. *120 p. 14 pl., 9 fig.* 1918.—Twelve distinct strains of the Valencia variety (*Citrus aurantium sinensis* L) have been isolated by bud selection. Six of these twelve variations have been closely paralleled in the author's investigations of the Washington Navel variety. Individual performance records for 105 trees extending over a period of four years are given. These records show that off-type fruits are produced by the same trees year after year.—As in the Navel orange, most variations are commercially undesirable and their elimination can be accomplished by proper selection of fruit-bearing bud wood from trees with a high performance record. [See preceding and following Entries, 707, 709.]—*J. H. Kempton.*

709. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: a study of bud variation in the Marsh grapefruit.** U. S. Dept. Agric. Bull. 697. *112 p. 2 pl. 14 fig.* 1918.—Study of bud variation in Marsh grapefruit (*Citrus grandis* Osbeck) shows that variability occurs in this species with about same degree of frequency as has been noted in Washington Navel Orange and other varieties of *Citrus*. [See two preceding Entries, 707, 708.] In census of one of the most valuable groves near Riverside, California, it was found that about 25 per cent of the trees produced fruits having from 30–90 seeds each, the commercial standard for seedless fruits being not more than 12. High correlation has been found between this "seedy fruit" and trees with drooping habit of growth. This correlation permits identification of such trees wherever they occur and once recognized they can be rebudded to desirable seedless type. No trees have been found thus far in which all fruits of a tree were completely seedless though individual limbs bearing seedless fruits have been found.—Six major strains are named and described. Among these is one having bell-shaped fruit which is associated with late ripening, another with rough fruit correlated with globular shape, and third with corrugated fruit having pyriform shape with deeply creased rind, inferior flavor and little juice. Performance record tests reveal fact that certain trees bear only every alternate year while others are always unproductive.—Minor fruit variations have appeared but occur less frequently than in other *Citrus* varieties studied. Among these variations are fruits which resemble oranges externally. Some of these orange-like fruits resemble oranges, tangerines and grapefruits in flesh and juice characteristics. Other fruit variations have been observed such as raised or sunken sections or both, navel fruits, and chimeras, showing parts typical of two or more strains.—Authors have found also that fruits formed at other than normal blooming period often have pyriform or irregular shapes. These fruits usually have very thick rinds, coarse and bitter rag, and lack the distinctive grapefruit flavor of normal fruits borne by same trees. No explanation was found for the appearance of these characteristics in fruits produced out of season. The production of "off bloom" fruits appears, however, to be an individual characteristic. Authors state that there are well defined correlations between characters of fruit, foliage and flowers which, when fully worked out, will be of great importance in eliminating unproductive trees and in selecting trees for propagation. Variations all of which are commercially undesirable can be eliminated by selecting bud wood from tested trees.—*J. H. Kempton.*

710. Silver, Allen. **Finch hybrids.** Avic. Mag. 10: 98. Mar., 1919.

711. Smith, L. H. **Outline of a plan for corn breeding.** Illinois Agric. Exp. Sta. Circ. 221. *4 p.* 1918.—Concise presentation, with certain details left to individual worker, of two plans of breeding. Method A, *mass selection*, is recommended for the busy farmer; method

B, *pedigree selection*, for the breeder who can give the requisite time and careful attention demanded. First two sections of outline are common to both methods; the two plans differ in subsequent breeding operations.—(1) Foundation stock. Suggestions are made regarding choice of variety and selection and preparation of material for testing.—(2) The preliminary ear-row test. Instructions are given regarding the planting of the ear-row test in single or, preferably, in duplicate series. Ear-remnants are saved for future use.—(3) Subsequent breeding. From this point the breeding work may follow either one of two systems.

Method A, *mass selection*. The seed-remnants of the most productive ears, as determined by ear-row test, are to be mixed and planted in an isolated seed plot. From this plot seed is to be selected—with due reference to certain field considerations—and mixed for subsequent planting. This mass selection in the field is to be repeated annually for subsequent planting with, or without, the special seed plot.—Method B, *pedigree selection*. The distinct feature of this method is that the ear-row test is to be repeated another year with same material and that continuous selection and ear-row testing is included. It is recommended that ear-remnants of best ears, as determined by preliminary test, be carried over into more extensive ear-row test the second season. Alternate rows or portions of rows and checks are to be detasseled and seed is to be saved only from detasseled plants of best rows. This procedure is to be repeated in subsequent years. A multiplying plot from extra seed produced in the selected rows is provided for and commercial seed is to be selected from this plot.—*E. C. Ewing*.

712. STERN, ERICH. **Psychologische Bemerkungen zur Vererbungs- und Familienstatistik. [Psychological notes on inheritance and familial statistics.]** Arch. Rassen- u. Gesellschaftsbiol. 13: 67–74. 1918.

713. T. W. **Hybridization and cross-fertilization of flowers.** Gard. Chron. 65: 46. Jan. 25, 1919.—Author reviews article by John Heal on the same subject as above in which Heal states that *Vallota purpurea* failed to hybridize. [See Bot. Absts. 2, Entry 765.] This species was successfully crossed with *Cyrtanthus sanguinea* by author and the late Sir Trevor Lawrence. The small growing species of *Cyrtanthus* hybridize readily. Breeding *Fuchsias* is made difficult by marked deterioration in the progeny.—*Herbert Beaumont.*

714. TILDESLEY, M. L. **Preliminary note on the association of steadiness and rapidity of hand with artistic capacity.** Biometrika 12: 170–177. Nov., 1918.—Preliminary note based on data on 60 pupils with respect to age, years trained in drawing, artistic capacity, mathematical and musical ability, and steadiness and rapidity of hand as tested by three maze-problems of varying difficulty. Entrance of maze was at A and exit at Q, a continuous pencil track being drawn from A to Q. Performance was considered the better, the fewer "bumps" the pencil track made with boundaries of the maze path. A single measure of efficiency was obtained by combining number of bumps with time taken, the inverse product of the two being used. The slender material makes conclusions suggestive, at best. Steadiness and rapidity of hand are not the result of training, but are probably innate characteristics developing with age. For crafts in which these characteristics are essential, they can be obtained better by selection than by training. Good craft, mathematical ability, and musical ability are only slightly associated with rapidity of hand, but this association is an initial one (most marked in maze 1) and tends to weaken with experience. It is suggested that possibly certain faculties may be most intense at certain stages of growth, and if education seizes upon them at this stage and maintains their intensity, we may overlook their true origin and suppose them created by education. Other suggestions needing further investigation are made. —*J. A. Detlefsen.*

715. TRANSEAU, EDGAR NELSON. **Hybrids among species of Spirogyra.** Amer. Nat. 53: 109–119. *7 fig.* Mar.-Apr., 1919.—Hybridization between *Spirogyra communis* and *S. varians* and between *S. varians* and *S. porticalis* was observed in nature, and probable resulting hybrids were found. Character of zygote itself is always maternal, as would be expected from cytological behavior during conjugation. Reduction division is known to take place

during first two nuclear divisions of germinating zygote, followed by degeneration of three of the four nuclei. Segregation among hybrid filaments, therefore, is evident in first generation, but all cells of a given hybrid filament are alike. New combinations were observed as to shape and size of cells, shape and orientation of zygote. Natural hybridization among species of *Spirogyra* is, however, rare.—*Merle C. Coulter.*

716. VAN FLEET, W. **New everbearing strawberries.** Jour. Heredity 10: 14–16. *Fig. 7–8.* Jan., 1919.—See Bot. Absts. 2, Entry 732; 3, Entry 74.

717. WEATHERWAX, P. **Gametogenesis and fecundation in Zea Mays as the basis of xenia and heredity in the endosperm.** Bull. Torrey Bot. Club 46: 73–90. *Pl. 6–7, 2 fig.* Mar., 1919. —Embryo sac arises from lowermost of row of four potential megaspores, the other cells disintegrating during its development. Egg nucleus is sister to one of polar nuclei. Antipodals organize a small tissue in chalazal end of sac, later absorbed. Two very small crescent-shaped sperms are developed from generative cell of pollen grain before dehiscence of anthers. Experiments showed that pollen tubes may grow through "silk" 25 cm. long in about twenty-four hours. Probably only forward end of tube is alive for perhaps 1 or 2 cm. Contents of pollen tube is usually discharged into one of synergids which break down shortly after, producing much confusion of cytoplasmic structure in micropylar end of sac. Guignard's observations on double fertilization were confirmed, the two fusions taking place almost simultaneously. Endosperm develops much more rapidly than embryo. Current explanations of cytological basis of xenia are supported. The peculiarities of xenia give to the endosperm a genetic significance and strongly suggest a sporophytic interpretation of this structure. Irregularities in distribution of chromosomes within endosperm makes possible a form of segregation of factors which may account in xenia for departures from expectations, and therefore the cytological data in general offers satisfactory interpretations of certain unusual behavior.—*B. M. Davis.*

718. WHEELER, WILLIAM MORTON. **Two gynandromorphous ants.** Psyche 26: 1–9. *2 fig.* Feb., 1919.—Gynandromorph of *Lasius latipes* is combination of male and β-female. Female parts include entire middle of body (epinotum, petiole, hind legs), patches of head, other legs, and gaster, and strong tendency to deälation in hind wings only. Certain parts are intermediate. Internal structure could not be studied.—Second form described is dinergatandromorph (composite of male and soldier) of *Camponotus albocinctus.* Body is normal soldier, except smaller; head is much like soldier on left, resembles male on right. Appears to be first unmistakable case of soldier-male combination. Suggests that soldiers and workers are not determined by nutrition, but arise from different kinds of eggs. Author cites supporting evidence from termite castes, polarity of insect eggs, and experiments with castration; also regards new evidence as confirmatory of his theory that gynandromorph arises from pair of fused oöcytes. Discusses other hypotheses briefly.—*A. Franklin Shull.*

719. WICKS, W. H. **The effect of cross-pollination in size, color, shape and quality of the apple.** Arkansas Agric. Exp. Sta. Bull. 143. *19 p., 9 pl.* 1918.—See Bot. Absts. 2, Entry 733.

720. WOLFF, FRIEDRICH. **Ein Fall dominanter Vererbung von Syndaktylie. [A case of dominant inheritance of syndactyly.]** Arch. Rassen- u. Gesellschaftsbiol. 13: 74–75. 1918.

HORTICULTURE

J. H. GOURLEY, *Editor*

721. BLAKE, M. A. **Winter injury to fruit trees in New Jersey.** Proc. Amer. Soc. Hort. Sci. 15: 24–25. (1918) 1919.—New Jersey experienced the most severe winter in 1917–18 since official weather records have been kept. The severe weather set in early in December and continued for weeks. Flower buds of the peach were killed except in the more favorable sections. The Wickson plum suffered injury to the blossom buds, and cane fruits suffered in

the central and northern counties of the state. The Synder was the hardiest of the blackberries.—The most severe injury to trees themselves was with the peach where an unprecedented injury occurred to the roots even to a depth of 12–18 in., also considerable "collar" injury occurred, especially on the light soil types and upon dry knolls. The apple suffered similar injury but to a lesser degree; Gravenstein, Tompkins Co. King, Grimes and Baldwin suffered most. Varieties of peaches and apples which suffer most from root killing and collar injury are the ones that are the quickest to start into growth during favorable periods of winter and early spring.—*J. H. Gourley.*

722. **BROCK, W. S. Spraying apple trees in bloom.** Proc. Amer. Soc. Hort. Sci. 15: 80–81. (1918) 1919.—The apple varieties Ben Davis, Grimes, Winesap, Whitney, Lady, Westfield, Oldenburg and several other little known varieties were sprayed when in full bloom in three consecutive years, 1916–1918. The first spray was applied when the central bud opened, the second when the trees were in full bloom and the third two days later. Bordeaux mixture 4-4-100, lime sulphur 1:20 and scalecide 1:20 were used on different groups and the first two were both applied to certain trees. In all cases the trees were thoroughly drenched.—The results showed no injury to blooms with the exception of some yellowing and premature dropping of the petals where the lime-sulphur was used. The trees bore full crops of fruit.—It is suggested that an application of a fungicide during full bloom would be desirable, especially to scab-susceptible varieties.—*J. H. Gourley.*

723. **CHANDLER, W. H. Winter injury in New York state during 1917–1918.** Proc. Amer. Soc. Hort. Sci. 15: 18–24. (1918) 1919. The growing season of 1917 was one of the shortest on record, being at least three weeks shorter than normal. The temperature throughout the summer in many sections of New York was below normal and the rain-fall was heavy and as a consequence the wood went into winter in a poorly ripened condition. The winter was extremely cold and the duration of the cold periods was great. The feature of the winter that played such an important part in the injury that resulted was the low temperatures in December, for trees become more hardy as the winter advances. The fruit-growing regions of New York were visited during the summer of 1918 and the conditions recorded.—In Niagara, Orleans and Monroe counties the weather was the least severe, with a temperature ranging as low as −7° or even −12°F. This temperature was reached in February rather than in December. While the buds and wood of most varieties of peaches were injured the J. H. Hale proved the most tender and Rochester the hardiest. Pears were injured to some extent in the sap-wood and also such apples as Baldwin, Rhode Island Greening and Tompkins Co. King, while many Hubbardston trees that fruited heavy in 1917 were entirely killed.—In Wayne county the temperature reached −20° F. and peach trees were badly killed. The older the trees and the heavier the crop in 1917 the worse was the injury. Younger trees recovered rather well. Sweet cherries appeared only slightly injured in the spring but later proved to have been little hardier than the peach. Angoulene pear trees were largely killed and Bartlett, Bosc and Kieffer suffered seriously. There was much injury to both old and young wood of Baldwin, Rhode Island Greening, Tompkins Co. King and Hubbardston apples. Ben Davis, Northern Spy and Twenty Ounce were seldom injured in this section.—In the Ithaca section the temperature reached −24° F. and peach trees were more severely hurt than in Wayne county, yet less than 20 per cent failed to recover in some degree and one-half were worth retaining. If such trees were treated with 4 pounds of nitrate of soda they recovered much faster. More than half of the sweet cherry trees died during the summer, while such hybrid varieties as Reine Hortense and May Duke showed some injury and made a weak growth in 1918, and Eugenia showed no injury whatever. Little injury occurred to the sour cherry. Pears were injured but not many killed. Wickson and other *Triflora* plums were severely injured with the exception of Burbank and Abundance varieties. Many varieties of apples suffered, the hardier ones being Ben Davis, Winter Banana, Wealthy, Twenty Ounce, Fameuse, McIntosh, Oldenburg, and other Russian sorts.—In Oswego county, where the temperature went still lower, even the Northern Spy and Wealthy were injured and many Baldwins were killed.—In Champlain county, where −30° F. was recorded, trees of Fameuse were

killed and some injury occurred to McIntosh and Oldenburg.—In the Hudson river section the temperature was as low as in Wayne and Ontario counties, but there was much less injury to all fruits with the exception of Baldwin apples that had fruited in 1917. This region had little rainfall the fall previous, and the trees were more mature than in the other sections where the rainfall was heavy. Some root-killing occurred in this region on the drier soils.—A discussion is given concerning the nature of the injury and tissues involved, also on the duration of cold which will cause killing of buds and wood of the common fruits. Apparently a close relation exists between maturity (or power to resist cold) and the amount of foliage. If trees were defoliated or partially so the branches from which leaves were removed were much more tender. This seems to indicate that "something must come from the foliage during the late season that results in a change, perhaps in the nature of the protoplasm such that it becomes more resistant to freezing."—*J. H. Gourley.*

724. Connors, C. H. **Methods in breeding peaches.** Proc. Amer. Soc. Hort. Sci. 14: 126–127. (1917) 1918.—In an attempt to secure a number of peach stones by crossing known parents it was found that ordinary yellow paper sacks or bags of mosquito bar were not satisfactory. The paper bags caused a yellowing of foliage and hindered the proper development of the fruit while the mosquito bar bags had other disadvantages. Finally large tents of cheese cloth were built about the entire tree. The primary part of the work was to study inheritance of size of blossoms. The varieties used were Greensboro with large blossoms, Belle with medium blossoms, and Elberta and Early Crawford with small blossoms. Trees were divided into four equal parts and three parts were emasculated and pollinated with each of the other varieties. The fourth part was left to be self-pollinated. After the fruits had set, the tents were taken down and the fruits left to mature to almost the point of dropping. They were then picked, the stones removed, dried and placed in sand for stratification. In the spring they were opened and planted in nursery rows. The seeds of the early Clingstone varieties would not mature. Early freestones or semi-clings, such as Carman and St. John gave a small percentage from stone to tree, about 10 per cent, while the later freestones gave about 50 per cent. A total of 403 trees descended from known parents was planted in 1916 and 1073 seedlings from known parents were planted in 1917. In addition to the above there were planted also 258 seedlings from open pollinated blossoms. [See Bot. Absts. 3, Entry 608.]—*E. C. Auchter.*

725. Gourley, J. H. **Sod, tillage and fertilizers for the apple orchard. A ten-year summary.** New Hampshire Agric. Exp. Sta. Bull. 190. *40 p., 6 fig.* 1919.—This paper reports a ten-year summary on an experiment with cultural practices and the use of fertilizers in a mature Baldwin apple orchard. The location of the orchard was such that the trees suffered from spring frosts or winter injury in six out of the ten years which lowered the average yield of the trees. The trees which remained uncultivated and unfertilized throughout the period of the experiment did not yield sufficiently well to warrant the use of the land for orcharding and they also made an inferior growth. The average yield was 135 pounds of fruit per tree and 5.09 inches twig growth per year. Tillage every other year resulted in a decided benefit to the trees which under farm conditions in New Hampshire might prove satisfactory, but better results were obtained by other methods of culture. The average yield of the two plots under this treatment was 191 pounds per tree and 6.11 inches twig growth per year. Clean cultivation, without the use of cover crops or fertilization, proved to be a successful method of reclaiming a run-down orchard, increasing the yield over the sod grown trees by 94 per cent and the twig growth by 43 per cent. It has shown evidence, however, that it could not be continued over a long period of years without additional fertility, since at the end of the ten-year period the trees were not making as good an average growth as at the end of the five-year period. Tillage with cover crops proved to be a slightly better system to follow in this orchard than clean tillage, but here the growth of the trees failed to maintain as good a growth in the second five-year period by 18 per cent. The yield of this plot was 268 pounds per tree and 8.21 inches twig growth per year.—Five plots which received the cultivation-cover crop system of culture were also treated with varying amounts of a complete fertilizer. These treatments resulted in an increased growth of the trees which averaged

12 per cent greater than the cultivation-cover crop plot. The yield of these plots, however, did not increase more than the untreated one, averaging 225 pounds per tree. The difference in yield in favor of any of the combinations of complete fertilizer used was not preponderant. It is suggested that the increase in size of the trees should result in an increased yield in the near future. The fertilizer which was richest in potash produced the largest apples each year and the quality of them was somewhat better.—Lime had no obvious effect upon the orchard.—The experiment is to be continued.—*J. H. Gourley.*

726. HENDRICKSON, A. H. **The common honey bee as an agent in prune pollination.** California Agric. Exp. Sta. Bull. 291: 215–236. *13 fig.* 1918.—This is the second report of the part played by the honey bee in the pollination of prunes in the Santa Clara Valley. The experiment was carried on in 1917. The varieties French and Imperial prune were used in the test. Three trees of each variety were worked with, making a total of six. The trees were covered with mosquito bar tents. Two double tents were erected, each enclosing a pair of adjoining French and Imperial prunes. In only one of the double tents was placed a hive of bees. Pollen carrying insects were excluded from the other double tent. Single tents covered the two remaining trees, a French and an Imperial. In each single tent was placed a hive of bees. The results showed quite strikingly in the case of the French prune, that although it is apparently self-fertile, still bees were needed to distribute the pollen sufficiently to cause even a light set of fruit. The tree enclosed with bees set 19 per cent while the trees from which bees were excluded set 0.43 per cent. The French tree enclosed with the Imperial and bees set 5.5 per cent. The average orchard set for this variety was 13.2 per cent.—Quite similar results were secured with the Imperial prune. Although not as self-fertile as the French, still bees caused a set of 3.02 per cent as compared to a set of 0.34 per cent where bees were excluded from the tent. The Imperial tree was plainly benefited by cross pollination with the French tree. Both tests showed that even where the two trees were under the same tent with bees excluded the set was practically nil in both cases. Under the same tent but with bees present a very good set was obtained, thus again proving the great value of bees.—Orchard counts for three years of certain French trees, some only one row away from the Imperial and others five rows away, showed in each case a slightly larger percentage of set on the French trees next to the Imperials than on those farther away. The first row was nearer the bees and evidently more thoroughly worked by them. The average orchard set in 1916 was 3.6 per cent for the French prune as compared to 13.2 per cent in 1917. It is suggested that the much greater quantity of bees in the orchard in 1917 was at least partly responsible for this increase. Observations and reports from different orchardists likewise showed an increase of fruit in 1917, wherever bees had been placed in the orchard.—Heavily loaded trees in 1916 set a light crop in 1917 but made an unusually good vegetative growth. The reverse condition was also true. Trees that set lightly in 1916 made a good vegetative growth and set more heavily in 1917.—*E. C. Auchter.*

727. HENDRICKSON, A. H. **Five years results in plum pollination.** Proc. Amer. Soc. Hort. Sci. 15: 65–66. (1918) 1919.—This work was prosecuted with the object of securing reliable data on the fertility-sterility problem of plums for commercial growers in California. Over 100,000 hand pollinations were made to determine the effects of selfing and crossing and records were made on the normal set under orchard conditions which involved a count of over 175,000 blossoms. As a result of this work it was determined that the following Japanese varieties are self-sterile: Combination, Kelsey, Satsuma, Burbank, Wickson, Sultan and Abundance. The Climax is evidently self-fertile or partly so. The Domesticas that are clearly self-sterile are: Clyman, Tragedy and Robe de Sergeant, while the Imperial is uncertain. Grand Duke is probably self-sterile, and the French and Sugar prunes are undoubtedly so. There were no cases of inter-sterility observed in either Japanese or Domestica plums. [See Bot. Absts. 3, Entry 635.]—*J. H. Gourley.*

728. MOORE, J. G. **Winter injury to fruits in Wisconsin in 1918.** Proc. Amer. Soc. Hort. Sci. 15: 31–32. (1918) 1919.—Injury to the various tree fruits is discussed briefly. The apple suffered no more than usual, while plum trees were more severely injured. The most serious injury occurred to the flower buds, particularly those of the Sour Cherry.—*J. H. Gourley.*

729. NORTON, J. B. S. **The relation of time of blooming to ripening period in peach varieties.** Proc. Amer. Soc. Hort. Sci. 15: 66–67. (1918) 1919.—A tabulation is made from data given in Hedrick's Peaches of New York, to determine the relation of time of bloom and ripening of fruit with the peach. There appear to be many exceptions, but, in general, the later the blooming period the later the fruit ripens.—*J. H. Gourley.*

730. NORTON, J. B. S., AND C. E. LEATHERS. **Conditions detrimental to seed production.** Maryland Agric. Exp. Sta. Bull. 216: 175–226. 1918.—Several general factors detrimental to or those which hinder good seed production are first discussed. Among those discussed are lack of pollination, inbreeding, self-sterility, and crossing or mixing. The second part of the report discusses the factors which are detrimental to good seed production in several different horticultural plants. Difficulties in proper pollination are discussed as a factor in several of these plants. A bibliography is included. [See Bot. Absts. 1, Entries 628, 747; 3, Entries 276, 656.]—*E. C. Auchter.*

731. PADDOCK, W. **Winter injury in Ohio.** Proc. Amer. Soc. Hort. Sci. 15: 30–31. (1918) 1919.—The peach section about Port Clinton suffered seriously during winter of 1917–18, fully 90 per cent of trees above six years old were either killed or made nearly worthless. Fruit buds survived the winter on some trees that were so badly injured that no leaves were put forth during the following season and some of these blossoms matured their fruit. It was demonstrated that moderate pruning of frozen peach trees is better than light or severe pruning.—*J. H. Gourley*

732. VAN FLEET, W. **New everbearing strawberries.** Jour. Heredity 10: 14–16. *Illust.* Jan., 1919.—The varieties of everbearing strawberries now being so largely grown in America are descendants of the Pan American, a sport or mutation of Bismark, a former commercial variety of the *Fragaria virginiana* type in which the runners are suppressed, favoring the successional production of fruiting crowns during the growing season. This characteristic appears to be hereditary in seedlings and hybrids of the Pan American. Progressive and Superb are the most widely grown varieties of the "everbearers," but they are poor plant makers. New seedlings are being grown of these and other varieties of this new type as well as crosses with the best spring-fruiting commercial varieties in order to add other desirable features to the everbearing varieties. The European Alpine strawberry *Fragaria vesca* is being used for crossing also as it has a long season of ripening.—A new type of *Fragaria vesca* has been introduced from Chili which appears promising. Seeds were forwarded from that country in 1914 by Prof. W. F. Wight and plants have been grown from them at Rockville, Maryland and Chico, California. The plants show greater vigor, fruitfulness and general adaptation to our climate than any Alpine which has been introduced. The plants have endured the hot, dry summers and fruited continuously from June until frost and also threw out a large number of strong runners. The berries were of good quality, but small and not firm enough for shipment. The stock is being used for further breeding work. Crosses were made with Chesapeake and Early Jersey Giant and about 400 plants fruited in the field in 1917 at Glendale, Maryland, showing high merit as June-fruiting varieties but displaying no tendency toward continuous bearing. Runners from two of the best plants were selected and crossed under glass early in 1917. Four of the resulting seedlings are very promising, producing large berries continually from July until November, and a good supply of vigorous runners. Crosses from this source appear likely to supplant those from the Pan American for commercial purposes.—*J. H. Gourley.*

733. WICKS, W. H. **The effect of cross-pollination on size, color, shape, and quality of the apple.** Arkansas Agric. Exp. Sta. Tech. Bull. 143: *19 p., 9 pl., 40 fig.* 1918.—Results of three years' investigation of the immediate influence or effect of the male parent on size, color, shape, and quality of the fruit of the female parent are given. The work was done during the years 1915–16–17 in a typical commercial orchard. The varieties used were Ben Davis, Jonathan, Winesap, and Grimes. In all cases, besides being selfed, each variety was crossed with the other three. During the three years a total of 11,290 pollinations were made, which

produced 773 apples of all varieties. The total per cent of fruit set for the three years for Grimes as a female was 49.26, Ben Davis 32.71, Jonathan 18.67 and Winesap 9.42. Winesap was also the most difficult variety from which to secure pollen. The greatest mutual affinity was shown to exist between varieties as follows: Ben Davis by Grimes, Grimes by Jonathan, Grimes by Ben Davis, Ben Davis by Jonathan. Cross pollination as a rule increased the percentage of fruit set. In a study of the crossed fruit, no influence of the male pollen of any variety could be detected on size, color, shape or quality of the fruit of the female parent. Light, plant food, temperature, and moisture are considered as more important in influencing these factors. The author concludes that the facts obtained justify apple growers in planting varieties primarily for the benefit of cross-pollination to secure the normal development of the apple.—*E. C. Auchter.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. Sinnott, *Editor*

THALLOPHYTES

734. Atkinson, Geo. F. **The genus Endogone.** Brooklyn Bot. Gard. Mem. 1: 1–17, 1918.—This obscure fungus, variously placed in the course of its history in all the three great divisions of fungi, is placed by the author in the Phycomycetes, although it is said to approach close to certain Protoascomycetes. *Endogone sphagnophila* n. sp., growing on sphagnum, is described and comparisons are made with other species, especially with the subterranean *E. lactiflua* Berk. *E. sphagnophila* consists, when mature, of orange yellow, pulvinate bodies, 2–4 mm. in diameter, enclosed in a tough, white peridium, enclosing a mycelium made up of non-septate, branched coenocytic hyphae 10–15 μ in diameter. The two gametes are about equal in size and are multinucleate. An oval or elliptical zygote, 35–60 μ x 30–45 μ, is formed as an outgrowth from the point of conjugation of the pair of gametangia. The nuclei in the zygote (5–10 being derived from each gamete) appear to be associated and finally to fuse in pairs. Germination of these resting spores was not observed.—*E. W. Olive.*

735. Dodge, B. O. **Studies in the genus Gymnosporangium. I. Notes on the distribution of the mycelium, buffer cells, and the germination of the aecidiospore.** Brooklyn Bot. Gard. Mem. 1: 128–140. *Pl. 1., 5 fig.* 1918.—The author publishes observations on five species of *Gymnosporangium: G. Ellisii, G. biseptatum, G. transformans,* and *G. fraternum,* with telial stage on *Chamaecyparis,* and *G. clavipes,* with telial stage on *Juniperus.* The mycelium of *G. Ellisii* is intercellular and the fascicled hyphae invade every tissue except the cork. They are especially abundant along some of the medullary rays. Haustoria are not abundant but may be found occasionally in cells of the cortex medullary rays. In *G. biseptatum,* the intercellular mycelium is distributed through the cortex down as far as the cambium. The abundant haustoria are strikingly large. In *G. clavipes,* them ycelium is intercellular and lies for the most part well out in the cortex just beneath the cork. This species may develop spores in one year if found near the growing point where food is abundant; or the development may take two years if the infection is in regions less favorable. Strictly foliicolous, superficial sori may also develop, in which case the mycelium is limited in extent. *G. transformans* and *G. fraternum* are two leaf-inhabiting forms on *Chamaecyparis,* the former having its aecial stage on *Aronia,* the latter on *Amelanchier.* Haustoria are especially abundant in *G. fraternum,* sometimes eight or ten to a cell, but commonly two to four. In *G. transformans,* haustoria are only occasionally met with, in palisade and mesophyll cells. Other distinctive features are the buffer cells formed in the telial sori, which are especially long and prominent in *G. fraternum;* and the 2-celled teleutospores, which are also comparatively long in the latter species. The binucleated aecidiospores of *G. transformans* commonly divide at once, on germination, to make four-nucleated germ-tubes.—*E. W. Olive.*

736. McDougall, W. B. **Development of Stropharia epimyces.** Bot. Gaz. 67: 258–263. *10 fig.* 1919.—The development of the fructification of this species from a very early stage of

the carpophore is described. The first internal differentiation of the carpophore is the appearance of the hymenophore primordium. The annular gill cavity is soon formed and enlarges rapidly. The universal veil disappears before the carpophore is mature. The development of the lamellae is similar to that of *Agaricus Rodmani* as described by Atkinson. This species agrees with *Agaricus*, *Armillaria* and *Stropharia* in having the hymenophore primordium develop before those of the pileus and stem, thus constituting an addition to the third of the three groups into which Atkinson divides the Agricaceae with endogenous origin of the hymenophore. A close relationship between *Agaricus* and *Stropharia* is suggested. [See Bot. Absts. 2, Entry 1001.]—*E. W. Sinnott.*

PTERIDOPHYTES

737. BROWN, ELIZABETH WUIST. **Regeneration in Phegopteris polypodioides.** Bull. Torrey Bot. Club **45**: 391–397. *3 fig.* 1918.—Spores of this species were sown on Prantl's and Knop's nutrient solution and allowed to develop without changing. The primary leaves of the resultant sporophytes, mostly apogamous, were cut and placed on sand or inserted in it to a depth of from 1 to 2 mm. and moistened with the same solution or with distilled water. In only one case regeneration resulted, appearing near the base of a detached leaf of a young sporophyte. A cellular mass, resembling a prothallium, was formed, from which rhizoids, intermediate structures between leaves and prothallia, and true leaves, developed. These true leaves resembled those of normal young sporophytes and were followed by leaves of a much simpler type.—*F. G. Smith.*

738. STEIL, W. N. **A study of apogamy in Nephrodium hirtipes, Hk.** Ann. Bot. **33**: 109–132. *Pl. 5–7.* 1919.—A summary is presented of the literature upon apogamy in ferns. The prothallium of the species studied develops from a spore, and attempts to induce typical apospory have been rarely successful, though the development of secondary prothallia from young sporophytes is readily induced by cultural conditions. The gametophyte never produces archegonia, but normal antheridia and antherizoids are formed. The embryo arises as a vegetative outgrowth of the prothallium, the apical cell of the leaf appearing first, then that of the root and then that of the stem. The foot is absent. The later development of the embryo resembles that of ferns where the embryo arises from fertilization. No nuclear migrations or fusions were observed in the prothallium at the time when the embryo begins its development. Sporogenesis in this species was also studied. After 8 sporogenous cells have been produced in the sporangium, they undergo incomplete division as a result of which the nucleus of each contains the diploid number of chromosomes—between 120 and 130. These cells function as spore mother cells and the (normally) 32 spores produced have the haploid number of chromosomes, which number is retained in the cells of the gametophyte and the apogamous sporophyte. The author discusses the origin of apogamy in this species.—*E. W. Sinnott.*

739. WATSON, E. E. **Relation between habitat and structure in Pteris aquilina.** Rept. Michigan Acad. Sci. **20**: 246. 1918.—The diverse habitats in which this fern grows produce noticeable structural differences as to cell size, number of stomata in the leaf, and amount of interfascicular mechanical tissue in the petiole. [See Bot. Absts. 2, Entry 882.]—*E. F. Woodcock.*

SEED PLANTS

740. BUCHHOLZ, JOHN T. **Studies concerning the evolutionary status of polycotyledony.** Amer. Jour. Bot. **6**: 106–119. *25 fig.* 1919.—In the development of the embryo of a number of species and genera of conifers the author finds no indication of the splitting of cotyledons, but brings forward evidence that fusions between cotyledonary primordia occur during development, the average number of primordia in young embryos being consistently greater than the average number of mature cotyledons produced. This excess of primordia is believed to be a recapitulation of a more primitive condition where the cotyledons were more numerous. The primitive gymnosperm embryo had numerous, imperfectly cyclic cotyledons, probably

derived from spirally arranged leaves. "Cotyledonary fusions reduced the number of cotyledons and also produced cotyledonary tubes in many species. Dicotyledony was attained either by a general fusion of many cotyledons in two groups, or by an extremely bilabiate development of a cotyledonary tube, and monocotyledony is the result of a cotyledonary tube becoming unilabiate in the course of its development. The polycotyledonous condition is therefore primitive and the dicotyledonous one is derived."—*E. W. Sinnott.*

741. CLARK, F. R. **Bud formation of plant hypocotyls.** Rept. Michigan Acad. Sci. 20: 146. 1918.—The author experimented on seedlings which do not normally produce buds along the internode of the hypocotyl. The tops were removed so that only this internode remained above the ground. *Solanum dulcamara* regenerated at its tip a new top, the first growth being observed at the end of 2 weeks. In plants of *Linum sp.* new growths appear from the side of the hypocotyl rather than from the tip.—*E. F. Woodcock.*

742. COUTANT, MARY WOTHERSPOON. **Wound periderm in certain cacti.** Bull. Torrey Bot. Club 45: 353–364. *Pl. 9, 3 fig.* 1918.—The two species studied were *Opuntia versicolor* Engelmann and *O. discata* Griffiths, growing in the vicinity of Tucson, Arizona. The anatomical structure of the stems, essentially identical, is described, especially the mature periderm, which is made up of alternating zones of suberized thin- and lignified thick-walled tissue. Wounds were made by slitting the stems with a razor or piece of glass, never more than to the center of the pith. Examination of the wounds on successive days showed the following results: a loss of starch in the region parallel to the wound and an increase of oxalate in the most exposed cells; the appearance in this starchless area of a meristematic layer, the phellogen; the discoloration and lignification of the cells outside of this; the storage of starch by the cellulose-walled phelloderm; the production by the wound-phellogen of alternating layers of thick and thin-walled cells; and the formation of a second interior meristematic layer, which produces new vascular bundles parallel to the wound surface.—*F. G. Smith.*

743. DORETY, SISTER HELEN ANGELA. **Embryo and seedling of Dioon spinulosum.** Bot. Gaz. 67: 251–257. *Pl. 10–11.* 1919.—The general structure and the vascular anatomy of the embryo and seedling of this species is not markedly different from the ordinary cycad type, despite the large size of the whole plant and of the ovulate strobilus and ovules. The cotyledons vary from 2 to 4 in number, are often deeply lobed and are multifascicular. Extrafascicular cambium is absent. The large size of the stem makes possible a clear demonstration of the origin and course of the complicated "girdling" leaf traces.—*E. W. Sinnott.*

744. GLEASON, H. A. **Scirpus validus for demonstrating procambium.** Rept. Michigan Acad. Sci. 20: 153. 1918.—*Scirpus validus* is exceptionally fine for demonstrating procambium, since this plant grows from a basal meristem, and in a single cross section there may be seen all stages in the development from minute procambium areas of a few cells to bundles of mature form and size.—*E. F. Woodcock.*

745. HAYDEN, ADA. **The ecologic subterranean anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. 6: 87–105. *Pl. 15–28.* 1919.—A study of the gross and minute structure of the subterranean organs of 32 species of prairie seed plants, with particular reference to their physiological anatomy. In plants of dry habitats, mechanical tissue is abundantly produced and parenchymatous tissue reduced in amount. In moist habitats this condition is reversed. The amount of vascular tissue seems not to be closely correlated with habitat. Aerenchyma is abundant in swamp plants. The subterranean stem is the equivalent of the primary root, functionally, and is more efficient than the root in propagation. Attention is called to the usefulness of the pith as a water reservoir.—*E. W. Sinnott.*

746. KITCHIN, P. C. **The Relation between the Structures of Coniferous Woods and their Penetration by Preservatives.** Rept. Michigan Acad. Sci. 20: 203—221. *Pl. 11-12.* 1918.—A careful study of the individual tracheids of *Larix laricina* and *Larix occidentalis*, with reference to their role as conductive structures in the penetration of preservatives. Though

similar in most of their characters, they differ in those structures most concerned in the passage of creosote oil into wood, i.e.,—in their penetrable bordered pit area. This area is the pit membrane less the torus, and seemed to be the only factor which showed a consistent relation to the penetration of preservatives. At a pressure of 100 pounds per sq. in. for 30 minutes, with the oil at a temperature of 20°C. *Larix laricina* with a penetrable pit area of 0.01100 sq. mm. gave a longitudinal penetration of 0.15 inches, while *Larix occidentalis*, with a penetrable pit area of 0.01798 sq. mm. had a longitudinal penetration of 0.31 inches. The simple pit areas varied in each of the various species studied and there was no evidence available that they were a factor in the preservative penetration. The appendix includes measurements of the penetrable bordered pit area per mm. of tracheid length for several species of Pinus and one of Abies, as well as the penetrations on one specimen each of *Tsuga canadensis*, *Picea excelsa*, *Pinus taeda*, and *Pinus lambertiana*. [See Bot. Absts. 2, Entry 883.]—*E.F. Woodcock.*

747. Maillefer, Arthur. **Parthenocarpie d'Aristolochia Sipho. [Parthenocarpy in Aristolochia Sipho.]** Archives Sci. Phys. et Nat. Geneva 46: 90–91. 1918.—The examination of fruit of *Aristolochia Sipho* which apparently developed normally without fertilization showed, however, that the ovules were reduced to a spongy mass without anatomical differentiation.—*A. J. Eames.*

748. Record, Samuel J. **Mahogany and some of its substitutes.** Jour. Forestry 17: 1–8. 1919.—A key based on the gross characters of the woods is presented and is supplemented by descriptions of such structures as may be seen on a smoothly cut surface with the aid of a lens magnifying 10 to 15 diameters. Most of the important woods known to the trade as "mahogany" and also some woods commonly substituted are included. Representatives of 13 families and 27 genera, 11 of which belong to the Meliaceae, are described.—*Eloise Gerry.*

749. Salisbury, E. J. **Variation in Eranthis hyemalis, Ficaria verna, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth.** Ann. Bot. 33: 47–79. *20 fig., 10 tables.* 1919.—Meristic and substantive variations in the flowers of these species are described in detail. Meristic variation is mainly the outcome of two tendencies—fission (producing an increase in number) and fusion (producing a decrease). It may occur in all floral regions and its appearance in one part of the flower is usually correlated with its appearance in the other parts. Instances of branched stamens and carpels and of bifurcated petals are recorded. The supernumerary perianth segments have from their position apparently originated by fission, and only rarely do we find evidence that they have increased as a result of the transformation of other structures. The occasional appearance of a single pentamerous whorl in species which normally have a 2-whorled, trimerous perianth is probably due to a fusion between a member of the outer whorl with one of the inner. The curve of meristic variation in the androecium and gynoecium exhibits several maxima which correspond to numbers that are some multiple of three, and the author concludes that the flower of the Ranunculaceae was primitively trimerous, a point of interest in connection with possible relationships between this family and the monocotyledons. Substantive variations, in the nature of transitions between different floral organs, are not uncommon, and throw much light on the origin of the perianth. This the author believes to have been derived either entirely from modified foliage leaves or in part from bracts and in part from stamens. [See Bot. Absts. 2, Entry 703.]—*E. W. Sinnott.*

750. Woodcock, E. F. **Structure of Mature Seed of Eriogonum microthecum.** Rept. Michigan Acad. Sci. 20: 233–235. 1918.—The storage region inside the seed coats is endosperm and is differentiated into a central starch-containing region and an outer layer one cell in thickness which contains aleurone. The embryo lies in a median cavity in the starchy endosperm in such a position that the flattened cotyledons are turned back so that their basal end is toward the chalazal region, and their tips toward the micropylar region. The storage tissue is endosperm, not perisperm as suggested by Johnson, and the embryo is curved, not straight as commonly stated.—*E. F. Woodcock.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

751. CHAMBERLAIN, C. J. **The Living Cycads.** Univ. Chicago Science Series. *172 p. 91 fig.* Univ. Chicago Press: Chicago, 1919.—An elementary and more or less popular account of the Cycads, the two concluding chapters of which, devoted to the Evolution of Structures and the Lines of Evolution, are compact accounts of the evolutionary trends in the cycad phylum as they are understood by the author.—*E. W. Berry.*

752. ELLIS, DAVID. **Phycomycetous fungi from the English Lower Coal Measures.** Proc. Roy. Soc. Edinburgh 38^{2}: 130–145. [No. 13] *Pl. 1, 8 text fig.* 1918.—Fossilised hyphae with an occasional fructification are well known to every Paleobotanist who works with anatomically preserved petrifactions to be extremely prevalent in all the horizons from which fossil plants have been described. Nevertheless remarkably few adequate descriptions of fungi have been published, and of those still fewer have been convincingly illustrated.—Until a much larger number of facts has been accumulated, any scientific consideration of the evolution or early distribution of the groups is impossible, so that descriptions of forms are to be welcomed. Dr. Ellis describes under the name *Palaeomyces bacilloides* hyphae with probable organs of reproduction from the Lower Coal Measures. The plant is described as saprophytic, found in the leaf-base of *Lepidodendron.* Renault's species, *Palaeomyces gracilis,* Ellis re-describes and re-names, placing it in the genus *Peronosporites.* His text figure 2 is a little startling, but the paper is on the whole well illustrated.—*M. C. Stopes.*

PATHOLOGY

DONALD REDDICK, *Editor*

753. ALCOCK, N. L. **On the life history of the rose blotch fungus.** Kew Bull. Misc. Inf. 1918: 193–197. *Pl. 6, 2 fig.* 1918.—*Actinonema rosae* seems to winter in England only in the conidial stage as diligent search for the ascigerous stage has resulted in failure. This is comparable to the behavior of *Venturia inaequalis* in England and America. Similarly the two fungi in England produce lesions on the new wood in which the organisms hibernate and produce conidia abundantly the following year. Such lesions of *A. rosae* have been found on the varieties Juliet, Madame Ravary, La Tosca, Mrs. David Jardine, Gruss an Teplitz. Sections through acervuli on canes are illustrated.—Recent literature on the disease and its control is reviewed.—*D. Reddick.*

754. APPEL, O. **Über die Anfälligkeit und Widerstandsfähigkeit verschiedener Kartoffelsorten gegen Krebs. [On susceptibility and resistance of varieties of potatoes to wart.]** Arb. Ges. Förderung Baues u. d. wirtsch. Zweckmässigen Verwendüng der Kartoffeln Bull. 15. 1918.—Compilation of data showing that more varieties are susceptible to the wart than are resistant.—Time of maturing does not influence susceptibility.—Of 170 varieties tested the following 13 are resistant: Arnika, Danusia, Hindenburg, Ideal, Jubel, Juli, Lech, Magdeburger Blaue, Nephrit, Nieren rote Delikatessen, Roma, Salat neue, Sechswochen. [From abst. by O. VON KIRCHNER in Zeitschr. Pflanzenkr. 28: 344. 1918.]—*D. Reddick.*

755. BRUNER, STEPHEN C. **La pudrición del tomate y modo de evitarla. [Decay of tomatoes and methods of prevention.]** Rev. Agric. Com. y Trab. [Cuba] 1: 300–301. *2 fig.* 1918.—A report of investigations relative to the cause of decay in tomatoes exported to the United States. The losses are attributed chiefly to faulty methods of handling the fruit prior to shipping. Specific troubles mentioned are blossom-end rot, sunburn, the leaf diseases due to *Cladosporium fulvum, Alternaria solani, Septoria lycopersici,* decay in green and mature fruit due to *Rhizoctonia,* ripe-rot due to *Mucor,* a decay of green and ripe fruit caused by *Phytophthora,* supposedly the species *P. terrestria,* and decay due to *Phoma destructiva.* Recommendations for avoiding losses resulting from the decay of fruit in transit are given.—*S. C. Bruner.*

756. Bruner, Stephen C. **Enfermedades de la vid en Cuba. [Diseases of the grape in Cuba.]** Rev. Agric. Com. y Trab. [Cuba] 1: 406–409. *5 fig.* 1918.—A report relative to the diseases of the grape known to occur in Cuba. Downy mildew (*Plasmopara viticola*), powdery mildew (*Uncinula necator*), black rot (*Guignardia bidwellii*) anthracnose (*Gloeosporium ampelophagum*), leaf blight (*Cercospora viticola*) and rust (*Uredo vitis*) are reported. A brief description of each disease with suggestions for control are given.—*S. C. Bruner.*

757. Bruner, Stephen C. **La "Phomopsis" de la berenjena. [Phomopsis disease of egg plant.]** Rev. Agric. Com. y Trab. [Cuba] 1: 468–469. *2 fig.* 1918.—Note giving recommendations for the control of the eggplant disease due to *Phomopsis vexans*, based on the results of investigations conducted by the Florida Agricultural Experiment Station. The foot-rot or tip-over phase of the disease is reported as being the cause of serious losses in Cuba and the use of healthy seed is considered of especial importance in avoiding this trouble.—*S. C. Bruner.*

758. Crittenden, C. G. **Pecan diseases other than scab.** Georgia State Bd. Ent. Bull. 49: 44–48. *Pl. 12–13.* 1918.—The following diseases are described briefly: rosette (non-parasitic); brown leaf spot (*Cercospora fusca*); kernel spot (*Coniothyrium caryogenum*); nursery blight (*Phyllosticta caryae*); anthracnose (*Glomerella cingulata*); crown gall (*Bacterium tumefaciens*); mildew (*Microsphaera alni*).—*D. Reddick.*

759. Darnell, Smith, G. P. **Diseases of tobacco plants: blue mold and a bacterial disease.** Agric. Gaz. New South Wales 29: 82–88. *3 fig.* 1918.—Popular discussion of blue mold caused by *Peronospora hyoscyami.*—A disease following mold and thought to be bacterial in nature is described.—Brief descriptions of other diseases of tobacco including those caused by *Phytophthora nicotianae* and *Bacillus nicotianae.*—*D. Reddick.*

760. Doidge, Ethel M. **The characteristics of citrus canker and its eradication.** S. Afric. Dept. Agric. Bull. 3. *9 p., 13 fig.* 1918.—Popular description of the disease, means of dissemination of *Bacterium citri*, and the measures employed in South Africa to eradicate the disease.—The disease was introduced from Japan in 1905. Its subsequent spread has been confined practically to wet seasons. Bordeaux mixture has not proved an effective preventive. In 1917 further outbreaks occurred and in December of that year a sum of money was granted for eradication of the disease. All nurseries whether infected or not have been destroyed and the owners compensated. About 15,000 orchard trees have been found infected and destroyed by fire. Up to March 31, 1918, £28,000 was expended for inspection of orchards and nurseries and the eradication (including compensation) of infected trees.—*D. Reddick.*

761. Dufrenoy, J. **Les conditions écologiques du développement des champignons parasites. Etude de géographié botanique. [Ecological conditions in the development of parasitic fungi.]** Bull. Soc. Mycol. France 34: 8–26. 1918.

762. Dufrenoy, Jean. **Sur les tumeurs du pin maritime. [Tumors of the pine.]** Compt. Rend. Acad. Sci. Paris 166: 355–357. 1918.—Resin-exuding galls are abundant on the trunks and roots of maritime pine [*Pinus pinaster?*] in the Arcachon forest. The structure of the gall is described in some detail. Two kinds of cocci were observed and isolated and are thought to be the cause of the trouble.—*D. Reddick.*

763. Earle, F. S. **La Diplodia natalensis.** Rev. Agric. Com. y Trab. [Cuba] 1: 50. 1918. —A brief note. The author comments on an article by Bruner relative to *Diplodia natalensis* and gives the results of his own infection experiments with this fungus on citrus fruits. The organism penetrates the calyx, after which it finds ready access to the interior of the fruit by way of the peduncle.—*S. C. Bruner.*

764. Fisher, D. F. **Apple powdery mildew, and its control in the arid regions of the Pacific northwest.** U. S. Dept. Agric. Bull. 712. *28 p., 3 pl. 3 fig.* 1918.—Presence of powdery mildew (*Sphaerotheca leucotricha*) on apples (*Pyrus malus*) in arid Northwest may cause 50

per cent loss.—Experiments in pruning out infected twigs did not give satisfactory control, nor did spraying the trees while dormant with lime-sulfur solution. Use of sulfur sprays in the growing season gives control but injury, especially to fruit, is likely to result.—Under the conditions the following spraying program has proved best: Lime-sulfur solution (1–50) when the blossoms show pink and again when the blossoms have fallen; ammoniacal copper carbonate (5:3:50) three to four weeks after the second application.—Many fungicides were tested including colloidal sulfur, a formula for the preparation of which, is given.—*D. Reddick.*

765. HARTER, L. L. **A hitherto-unreported disease of okra.** Jour. Agric. Res. 14: 207–212. *Pl. 23.* 1918.—Disease occurs only on stems and pods of okra (*Abelmoschus esculentus*) where it appears as oval to oblong spots 2 to 3 cm. long.—Cause of the disease is *Ascochyta abelmoschi*, which is described as new. Abundant pycnidia are produced on the lesion and mycelium grows through the pod and into the seed from which it was isolated repeatedly. Pathogenicity was determined by experiment. Specific tests to infect leaves were unsuccessful. [See Bot. Absts. 1, Entry 409.]—*D. Reddick.*

766. HOFFER, GEORGE N., A. G. JOHNSON, AND D. ATANASOFF. **Corn-root rot and wheat scab.** Jour. Agric. Res. 14: 611–612. 1918.—The species of *Gibberella* occurring on corn (*Zea mays*) stalks and on wheat (*Triticum aestivum*) cross infect and are probably identical.—Confirming the experimental inoculation work, field observations have shown a conspicuously greater abundance of wheat scab in fields where wheat was grown immediately following corn that was infected with the Fusarium rot of root and stalk.—*D. Reddick.*

767. HUMBERT, J. G. **Tomato diseases in Ohio.** Ohio Agric. Exp. Sta. Bull. 321: 157–196. *12 fig.* 1918.—The symptoms, cause and control of the various parasitic and non-parasitic diseases affecting tomatoes in Ohio are considered. Fusarium wilt-resistant tomato trials for 1916 and 1917 are reported. The Acme strain as selected by Edgerton in Louisiana for Fusarium wilt resistance was immune to this disease under Ohio conditions and also exhibited resistance to Septoria and Alternaria leaf diseases. Beauty strains from Tennessee were highly resistant to this disease. Bonny Best, Acme and Early Detroit have responded to selection for disease resistance. Correlation of the prevalence of tomato diseases about Marietta with weather conditions for the growing periods over a 7-year interval show that a constant relationship evidently exists between high temperatures with low precipitation and a serious occurrence of Fusarium wilt and point rot.—*H. W. Dye.*

768. JENKINS, ANNA E. **Brown canker of roses, caused by Diaporthe umbrina.** Jour. Agric. Res. 15: 593–599. *Pl. D (colored), 46–47, 3 fig.* 1918.—The disease is known to occur in Eastern United States and probably is widely distributed. Cankers occur on any portion of the cane, the lesion being raw umber in color and sometimes surrounded by a purple border.—A technical description, with illustrations, of *Diaporthe umbrina* n. sp. is included. The pycnidial stage is like species of *Phomopsis*. Perithecia and pycnidia occur on the lesions and both have been developed in culture.—Proof of the pathogenicity of the organism is furnished.—Experiments in controlling the disease by cutting out and burning affected canes gave negative results.—*D. Reddick.*

769. JOHNSTON, J. R. **El plátano y sus enfermedades. [The banana and its diseases.]** Rev. Agric. Com. y Trab. [Cuba] 1: 419–421. *3 fig.* 1918.—Short account of the diseases of the banana plant (*Musa paradisia and M. sapientum*). The panama disease due to *Fusarium cubense* has caused serious losses in Cuba, being especially destructive to the varieties "manzano" and "Johnston." Recommendations for its control are given. Other diseases discussed are: root disease due to *Marasmius stenophyllus*; bud rot of the variety "macho" (possibly of bacterial origin); fruit rot (*Gloeosporium musarum*) and collar rot (cause not determined).—*S. C. Bruner.*

770. JOKL, MILLA. **[Pythium conidiophorum nov. sp., ein Parasit von Spirogyra.]** Osterr. Bot. Zeitschr. 67: 33–37. *1 pl.* 1918.—[From abstr. by MATOUSCHEK in Zeitschr. Pflanzenkr. 28: 344. 1918.]

771. Jones, Donald F. **Segregation of susceptibility to parasitism in maize.** Amer. Jour. Bot. 5: 295–300. 1918.

772. Keitt, G. W. **Inoculation experiments with species of Coccomyces from stone fruits.** Jour. Agric. Res. 13: 539–569. *Pl. 55–59., 3 fig.* 1918.—"This work has defined rather than solved, certain fundamental problems regarding host relationships and specialization of parasitism within the group of fungi under investigation." From the standpoint of host relationships, the strains of fungi studied are tentatively grouped as follows, according to the hosts from which they were procured: (1) *Prunus cerasus*, *P. avium*, *P. mahaleb* and *P. pennsylvanica*, (2) *P. domestica*, (3) *P. virginiana*, (4) *P. serotina*; but minor variations occur among the strains within the groups.—*P. mahaleb* was infected in varying degrees by inocula from all the host sources tested. *P. insititia* is also notably susceptible and possibly also *P. cerasifera*. *P. serotina* and *P. virginiana* on the other hand are notable for their resistance to cross infection, while *P. padus* was infected only by strains from *P. virginiana*. It appears from these tests that in Wisconsin no serious infection of cultivated cherries is induced by inocula from wild hosts (possibly excepting *P. pennsylvanica*) but it is evident that *P. americana* may act as a harborer of infectious material for cultivated plums. [See Bot. Absts. 1, Entry 419.]—*D. Reddick.*

773. Kiessling, Ludwig. **Über schädliche Nebenwirkungen der Formalinbeizung des Saatgutes auf die Keimung. [The injurious secondary effects of the formalin treatment of seed grain, upon germination.]** Jour. Landw. 66: 7–51. 1918.—Kiessling finds that commercial formaldehyde in the usual diluted solutions produces a distinctly injurious effect upon the vigor with which seed grain germinates. Soil conditions may therefore materially influence the injury which is apparent when the seedlings emerge. This injurious effect is intensified by agitation of the seed during treatment in a solution of formaldehyde, in the same way as if the treatment were prolonged or the solution made stronger. Using the ordinary treatments, it was found that mechanical injury of the seed, even of the embryo, did not materially increase the injury to wheat by formaldehyde. Poor seed may be temporarily benefited; but the residual effect of the treatment is generally worse with such seed. However, individual lots of seed differ widely in their reaction to the injurious effect of formaldehyde, and for various reasons.—An apparent stimulus to germination is sometimes evident. This may be due to the removal of certain inhibiting organisms, such as would occur on poor seed, or, in the case of new seed in which the germ has not yet attained full maturity, to an effect resembling the stimulus of narcotics. Such a stimulating effect may serve to neutralize the injury caused by treatment and confuse the results of a whole series of tests.—Impurities do not change the character of the effect of formaldehyde on seed grain, but generally do intensify it. Methyl alcohol is not the only impurity which may be concerned.—It is found that the dry storage of treated wheat is less injurious than storage under moist conditions. Treated wheat should be planted at once, however, and not stored if storing can be avoided. Oats were not found to be injured by storage after treatment.—Some reagent other than formaldehyde for the disinfection of seed grain is very much to be desired. Hiltner's formaldehyde mixtures (sublimoform and cupriform) are considered preferable because of the reduced proportion of formaldehyde required.—The compulsory treatment of seed grain is not considered feasible because of the risk of injury to germination by any of the treatments which have been devised and recommended for use in prevention of the smuts and other seed-borne diseases of cereals. It is also evident that commercial seedsmen cannot make use of formaldehyde to disinfect seed grain for sale, particularly wheat.— *Alden A. Potter.*

774. Lee, H. Atherton. **Further data on the susceptibility of rutaceous plants to citrus-canker.** Jour. Agric. Res. 15: 661–665. *Pl. 60–63.* 1918.—Needle-prick inoculation tests made in the Philippine Islands with *Pseudomonas citri* upon 24 species representing 20 genera of the family Rutaceae show that 19 of the species are susceptible in greater or less degree.—*Severinia buxifolia*, *Aegle marmelos* and *Balsamocitrus gabonensis* are immune to the disease and *Zanthoxylum rhetsa* and *Triphasia trifolia* seem to be immune. *Chalcas exotica*, *Ata-*

lantia disticha and *Fortunella japonica* are strongly resistant.—*Fortunella hindsii* on the summits of mountains (1500 feet elevation) in South China was found with abundant cankers. It is thought that this species may have been an original wild host from which the disease spread to cultivated species.—*D. Reddick.*

775. LEVINE, M. N., AND E. C. STAKMAN. **A third biologic form of Puccinia graminis on wheat.** Jour. Agric. Res. 13: 651–654. 1918.—A strain of *P. graminis* was found in Oklahoma which readily infects the six differential hosts employed in the separation of the forms *tritici* and *tritici-compacti*. It is not named. [See Bot. Abst. 1, Entry 422.]—*D. Reddick.*

776. LINSBAUER, L. **Richtlinien des Pflanzenschutzes im Gemüsebau. [Directions for plant protection in the vegetable garden.]** Österr. Gartenzeitg. 13: 41–48. 1918.—Directions for disinfecting seeds, sterilizing soil and general sanitary precautions to be observed. [From abstr. by MATOUSCHEK in Zeitschr. Pflanzenkr. 28: 337–338. 1918.]—*D. Reddick.*

777. MAGNUS, WERNER. **Wund-Callus und Bakterien-Tumore. [Wound callus and bacterial tumors.]** Ber. Deut. Bot. Ges. 36: 20–29. 1918.—This paper deals only with German researches on crown gall (1915–1918). The author has discovered that it is sometimes difficult to distinguish between crown gall and callous formation. He has also discovered that when a crown gall develops abundantly it interferes more or less with normal growth (callous-growth in his experiments). He thinks that crown gall develops only in wounds and thus affords important analogies with animal cancer.—For his experiments the author used slices of carrots in petri dishes inoculating with *Bacterium tumefaciens* received from Kral's laboratory. Here he found that inoculations with *B. tumefaciens* on the cut surface often led to tumors which interfered with the development of the callus on the opposite surface although in the checks that was the part which naturally developed callus. The paper apologizes to the extent of two pages for the various mistakes of the German investigators of crown gall, Friedemann and Magnus, Blumenthal and Hirschfeld. The original may be consulted for details.—The most interesting thing is the concluding paragraph and the literature citations, which show that the *Zeitschrift für Krebsforschung*, which in 1912 remarked in a review, that crown gall had nothing in common with cancer except its name (Krebs), is now receiving publications from German medical men on this subject, as is also the *Zeitschrift für Hygiene und Infektionskrankheiten*. Furthermore, the disease has now been made a subject of study in the Berlin University Institute for cancer investigations. [See Bot. Absts. 2, Entry 610.]—*Erwin F. Smith.*

778. MASSEY, L. M. **More about rose diseases.** Amer. Rose Ann. 1918: 64–71. *Pl. 4.* 1919.

779. NOWELL, WILLIAM. **The control of cacao canker in Java.** [Rev. of: HALL, C. J. J. De destrijding van den cacaokanker op de indermening "Kemiri." Meded. Lab. Plantenz. Batavia 30. 1917.] Jour. Agric. News Barbados 17: 78–79. 1918.

780. POLE EVANS, I. B. **Teff rust.** Kew Bull. Misc. Inf. 1918: 228–229. 1918.—*Uromyces pedicellata* n. sp. occurs on *Eragrostis abyssinica* in South Africa and crops grown late in the season are considerably damaged. The fungus occurs also on an indigenous species *E. curvula.*—*D. Reddick.*

781. POLE EVANS, I. B. **Citrus canker in South Africa and its eradication.** S. African Jour. Indus. 1919: 1–24. *15 fig.* Jan., 1919.—Popular account of citrus canker, caused by *Bacterium tumefaciens*, including a short history of the disease in South Africa and a description of the eradication campaign inaugurated.—The total expenditure on citrus canker inspection, eradication and compensation for trees destroyed up to December 31, 1918 is £51,000.—Copies of the quarantine proclamations are included.—"In conclusion, it may safely be said that the spread of the disease has been definitely checked, and that the only thing which now endangers the eradication work is the supply of necessary funds."—*D. Reddick.*

782. Rankin, W. Howard. **Manual of tree diseases.** *20 × 14 cm., xx + 398 p., 70 fig.* MacMillan Co.: New York. 1918.—Diseases of the more common trees of the United States are treated. Discussions of these diseases are grouped into chapters under the common name of the tree affected, and the chapters are arranged alphabetically. In a general chapter are included discussions of the diseases common to all kinds of trees, such as damping off of seedlings, temperature injuries to leaves and woody parts, smoke and gas injuries, wood rots and the like. The species of trees affected, the geographic distribution, destructiveness and symptoms of the different diseases are presented in full. The causal agent of the diseases is briefly described, and when it is a parasite some details of life history are given with suggestions as to control.—One chapter is devoted to tree surgery —In the appendix are given common names and scientific names, a glossary of technical terms employed and a bibliography of pertinent literature.—*D. Reddick.*

783. Robbins, W. W., H. E. Vasey, and G. E. Egginton. **Cleaned, treated and tested seed for Colorado.** Colorado Agric. Exp. Sta. Bull. 238. *40 p., 11 fig.* 1918.—Part III (p. 20–32) is entitled "Methods of seed treatment for the prevention of diseases in certain farm crops."—*D. Reddick.*

784. Sawada, Kaneyoshi. **[Japanese.] [A new rust fungus parasitic on the rose.]** Trans. Sapporo Nat. Hist. Soc. 7: 36–40. 1918.—English description of *Kuehneola rosae* n. sp. [See Bot. Absts. 2, Entry 110.]

785. Schoevers, T. A. C. **Meer staatsbemoeiing op het speciale gebied van bestrijding van plantenziekten en schadelijke dieren. [More information on the special subject of controlling plant diseases and destructive animals.]** Cultura 30: 164–171. 1918.

786. Spooner, C. S. **Pecan scab (Fusicladium effusum).** Georgia State Bd. Ent. Bull. 49: 38–48. *Pl. 14–15.* 1918.—Scab is the most serious disease of the pecan (*Carya*) in Georgia. —A list of susceptible and resistant varieties is given but there seems to be great variation depending on locality.—Experiments indicate that the disease may be held in check by the use of bordeaux mixture, 3 : 3 : 50. The number and time of treatments depend on weather conditions. A treatment should be made as soon as the nuts are formed and in very rainy seasons additional treatments are required at intervals of two weeks.—*D. Reddick.*

787. Stahel, Gerold. **De sclerotium-ziekte van de Liberia-koffie in Suriname. [The sclerotium disease of Liberian coffee in Suriname.]** Meded. Dept. Landbouw Suriname 13. *2 p.* 1918.—The disease was previously described from Suriname as the Coremium disease. Dark brown spots with distinct concentric rings are produced on the full-grown leaves. On the under side of the leaf coinciding with the darker rings are found numerous white fungous bristles, 2 to 4 mm. long. They bear no spores and are not coremia. They break off and are blown about by the wind and cause new infections. They also develop on diseased fruit which shows the same concentric marking. In damp situations small greenish brown or orange brown sclerotia are formed on the leaves and berries while still on the trees. A spore-bearing form could not be found. The mycelium has clamp connections. Disease can be controlled with Bordeaux mixture.—*C. robusta, C. uganda* and *C. arabica* are resistant while *C. abeocuta* and *C. excelsa* are susceptible.—*J. B. Rorer.*

788. Stahl, C. F., and Eubanks Carsner. **Obtaining beet leafhoppers nonvirulent as to curly-top.** Jour. Agric. Res. 14: 393–394. 1918.—Young nymphs of *Eutettix tenella* in emerging from the egg force their way, anterior end first, through the tissue of the petioles and midribs in which the eggs are deposited. It is possible to brush off the emerging nymphs before they have had a chance to feed and tests show that such nymphs are not carriers of the virus of the curly-top disease of sugarbeet (*Beta vulgaris*).—*D. Reddick.*

789. Stakeman, E. C., F. J. Piemeisel, and M. N. Levine. **Plasticity of biologic forms of Puccinia graminis.** Jour. Agric. Res. 15: 221–249. *Pl. 17–18.* 1918.—As a preliminary to

culture work it is necessary to isolate biologic forms from mixtures. How difficult this may be is illustrated in tables. If it is not done there is danger of erroneously concluding that bridging may have occurred.—Tests for four consecutive seasons with the forms *tritici*, *tritici-compacti*, *avenae* and *secalis*, show that biologic forms are neither broken down nor invigorated by passing through the barberry.—*Puccinia graminis secalis*, which does not attack wheat, but which does infect barley readily was cultured on barley and other theoretical bridging hosts continuously for three years during which time more than 2,000 wheat plants were inoculated. The rust acquired no new parasitic capability on account of its association with barley. Similar tests with other forms lead to the conclusion that "no one so-called bridging host nor any combination of such hosts enabled any biologic form tried to infect naturally immune plants nor to infect a highly resistant plant more readily."—Many attempts to increase the virulence of biologic forms on resistant hosts by successive transfers to these hosts indicate that rust forms do not gradually adapt themselves to resistant or semicongenial hosts, i.e., biologic forms appear to be roughly analogous to pure lines. Possibly *P. graminis avenae* is a mixture from which pure lines can be isolated.—Perceptible evolutionary changes have not been produced experimentally and no mutations have been observed. Practically this constancy of biologic forms is of importance in that breeding for rust resistance can proceed with considerable assurance that the same rust will not adapt itself quickly to new varieties.—*D. Reddick*.

790. SWINGLE, D. B., AND H. E. MORRIS. **Plum pocket and leaf gall on Americana plums.** Montana Agric. Exp. Sta. Bull. 123: 167–188. *6 fig.* 1918.—Plum pocket caused by *Taphrina communis*, and leaf gall, caused by *Eriophyes pruni*, are described and illustrated. Their presence on the native wild plum (*P. americana*), the only species grown commercially in the State, has made plum growing unprofitable.—Leaf curl, caused by *Taphrina decipiens*, occurs in the State but is not destructive.—The former troubles may be controlled by a single application of lime-sulfur solution (1:50) made just before the fruit buds open. Leaf curl can not be controlled in this way.—*D. Reddick*.

791. TAUBENHAUS, J. J. **Diseases of truck crops and their control.** *20 × 14 cm. xxxi + 396 p.*, E. P. Dutton & Co.: New York, 1918.

792. UZEL, H. **Bericht über Krankheiten und Feinde der Zuckerrübe in Böhmen und der mit derselben abwechselnd kultivierten Pflanzen im Jahre 1916. [Diseases and enemies of sugar-beet in Bohemia and the cultivated plants rotated with it.]** Zeitschr. Zuckerindust. Böhmen 42: 228–233. 1918.—Beet nematode, dry root rot of young plants and "dauerwurzelbrand" were present. Dry root rot is controlled by the use of 4 per cent raw perocid solution, treating for 6.5 hours. Heart rot often healed leaving only a hole in the top. [From abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 339. 1918.]—*D. Reddick*.

793. UZEL, H. **Über die Beurteilung des Rübensamens vom phytopathologischen Standpunkte aus. [On the judging of beet seeds from the pathological standpoint.]** Zeitschr. Zuckerindust. Böhmen 42: 364–370. 1918.—On the small leaves about the seed balls of beet mother plants the following were found: *Sporidesmium putrefaciens*, *Phoma betae*, *Cercospora beticola, and Cladosporium herbarum*. Seed disinfection is advised only for seed from diseased crops. Four per cent solution of perocid is the best disinfectant. [From abst. by O. von Kirchner in Zeitschr. Pflanenkr. 28: 339–340. 1918.]—*D. Reddick*.

794. UZEL, H. **Über Krankheiten und Schädiger der Samenrübe in Böhmen in den Jahren 1916 und 1917. [Diseases and enemies of seed beet in Bohemia in 1916 and 1917.]** Zeitschr. Zuckerindust. Böhmen 42: 423–430. 1918.—Much damage done by field mice. Seed heads were shattered by birds looking for insects.—A rot of the tap root, a chronic root disease and heart rot were present. [From abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 339. 1918.]—*D. Reddick*.

795. Van der Bijl, Paul A. **A cane leaf spot.** S. African Dept. Agric. Sci. Bull. **10:** 1–15. *6 fig.* 1918.—The disease is very similar in appearance to the eye-spot disease of Hawaii. Circular to oblong light-colored spots usually delimited by a dark brown ring appear on the leaf blades and midribs.—A fungus was isolated and inoculations on pieces of leaves in moist chambers resulted in typical lesions. The organism is closely related to if not identical with *Cercospora sacchari.*—The fungus grows well on various media producing spores of variable length (17.5 to 112 μ) and septation (3 to 12).—Any cell of a spore may germinate in water within an hour. Spores withstand desiccation at room temperatures as long as 32 days but not 49 days; they germinate at temperatures 11.6 to 37° whether placed directly in water or are first air dried for 17 hours.—*D. Reddick.*

796. Van der Bijl, Paul A. **Ring spot of cane leaves.** S. African Dept. Agric. Sci. Bull. **10:** 15–16. *Fig. 7.* 1918.—See Bot. Absts. 3, Entry 377.

797. Wakefield, E. M. **A disease of the yam. (Bagnisiopsis dioscoreae.)** Kew Bull. Misc. Inform. **1918:** 199–201. *Illust.* 1918.—*Bagnisiopsis dioscoreae* on *Dioscorea prehensilis* from Nigeria is described as new. The fungus occurs on the branches and is "undoubtedly parasitic." The length of nodes and size of leaves on affected branches is reduced. There is no adventitious growth "although the swelling of the attacked haulms, together with the tiny rather chlorotic leaves, produces the appearance of a witches' broom." The yam vines attacked, are on poor or swampy places.—*D. Reddick.*

798. Weston, Jr. Wm. H. **Report on the plant disease situation in Guam.** Rept. Guam Agric. Exp. Sta. **1917:** 45–62. 1918.—List of diseases of economic plants found on the Island in March, 1918.—Conditions in Guam which favor the development of diseases are: moist, tropical climate; primitive agricultural practices; unregulated importations of plants.—*D. Reddick.*

799. Wolk, P. C. **Het nieuwe gezichtspunt de serehziekte. [New viewpoint on "sereh."]** Cultura **30:** 302–306. 1918.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Henry Kraemer, *Editor*

800. Anonymous. **Mexico's little-known botanicals.** Drug and Chem. Markets **5:** 21. 1919.—General reference is made to the wealth in Mexico of natural products, little known outside the country. Specifically mentioned and very briefly discussed are the following; Cachuananche (Licania arborea Seeme), yielding abundant seeds with over 60 per cent of fixed oil valuable in the manufacture of artificial rubber. Chia (Salvia polstachya) said to produce a drying oil used in industries. Mamey (Lucuma mammosa); the oil in the seeds or the seeds themselves are used as cosmetics. Mosquitales; the tree yields a gum similar to gum arabic and the leaves are used in an eye remedy. Panete (Plumbago pulchella) yielding a caustic substance similar in effect to iodine (plumbagin is probably referred to—Ref.) Tabaquillo Oloroso (Hedeoma piperita) yielding an abundant mint like ethereal oil with 50 per cent menthol. La Raiz del Ozo Bear root, Valerian of Mexico considered a satisfactory substitute for the European drug. Azafrancillo (Carthamus tinctoria) used as saffron substitute in cooking. Chavacano (Prunus armeniaca) used for flavoring and Aguacate (Persea gratissima) growing wild but not as yet utilized, are also included in the list. The place of growth is usually given.—*Arno Viehoever.*

801. Huerre, R. **Sur la distillation sèche du bois de Juniperus Oxycedrus et de quelques conifères. [On dry distillation of wood of Juniper, etc.]** Jour. Pharm. Chim. VII, **19:** 33, 65. 1919.—The author has continued his studies on the oils of *Juniperus Oxycedrus* (see Jour. Pharm. Chim. VII, 121. Nov. 1, 1915). In the present investigation he has undertaken to study the relationship between the volatile oil obtained from the unheated wood and the oil

of Cade derived on the destructive distillation of wood. For convenience, he designates the oil of Cade "V" and the volatile oil "F."—Several conclusions are drawn from his experimental work. (1) Concerning the oil of Cade. Besides the differences in the fractions on distillation for determining the authenticity of the oil of Cade, the determination of the iodine number of Hübl and saponification figures furnish useful data on the adulteration of the oil. (2) Concerning the oils obtained from the cedar wood. It is evident that between the two oils V and F which have been studied comparatively after being prepared from wood of the same origin some rather distinct differences could be recognized, but except in the nature of the product derived by the evaporation of the ethereal solutions, one cannot determine any essential differences between the oils. Furthermore, the differences in the iodine number are not so apparent as the behavior of the two oils on fractionating. Although there is a distinct difference yet there is a striking resemblance between this oil and that naturally obtained on destructive distillation. This is interesting as it has some bearing on the origin and formation of the oils from the elementary hydrocarbons under the influence of metabolism in the plant. (3) Comparing the oil of Cade with the empyreumatic products derived from other Coniferae, he says: The color reactions on products obtained either by steam distillation or heating the empyreumatic oils do not show sensible differences from that of oils obtained from rather diverse sources. The fractional distillate and evaluation of the tarry residue do not enable one to differentiate the oils of Cade and the oils of Juniperus virginiana and Cedrus Libani. Distinct differences, however, were noted in the iodine number in oils of Cade and Cedrus Libani which had been previously treated with soda. On the contrary, the volatile oil (F) and the oil of Cade (V) are practically identical with that of the oil of Juniperus virginiana,—*H. Kraemer.*

802. Kauffman, C. H. The Agaricaceae of Michigan. Michigan Geol. Biol. Survey Pub. 26. (Biol. Ser. 5). 1918.—See Bot. Absts. 2, Entry 627.

803. Mirande. **[Hydrocyanic acid in ferns.]** Compt. Rend. Acad. Sci. Paris 167: 695. Nov. 4, 1918.—It is known that some plants containing hydrocyanic acid belong to the group of ferns; among others, *Pteris aquilina* Greshoff contains the glucoside amygdalin. Mirande proved the presence of a cyanogenetic glucoside (amygdalin) in the leaves of a fern rather common in the mountains of Savoy and Dauphiné, *Cystopteris alpina*. The leaves are macerated in water for several hours at a temperature of 25°–30°C. Subjected to steam distillation, the distillate contains hydrocyanic acid and benzoic aldehyde, the latter being detected by the formation of a hydrazone of this aldehyde under the action of acetic phenylhydrazine. The quantity of the glucoside, rather abundant at the beginning of the season, decreases little by little and reaches its minimum in September. The old leaves give a very faint odor of bitter almonds. This odor is also developed during dessication.—*H. Kraemer.*

804. Scoville, W. L. **Scammony and its substitutes.** Jour. Indust. Eng. Chem. 11: 335–336. 1919. Owing to the scarcity of jalap during the war, great interest was manifested in those drugs which would yield a similar active resin. [See Bot. Absts. 1, Entries 666, 669, 673.] This is a further study on this subject. A drug offered as *Resina drastica* and coming from Mexico, seemed in a general way to resemble *Ipomoea orizabensis*, but chemical examination showed it to be very different. The resin amounted to 19.2 per cent and the alcoholic extractive was 23.5 per cent. In general, this resembles both true and Mexican scammony resins. It is slightly more acid and is more strongly levorotatory. Its color alone would distinguish it, and treatment with decolorizing charcoal does not take out the color appreciably. When freshly precipitated it has an agreeable tea-like odor which disappears on drying. Probably a small amount of volatile oil is present in the drug. The powdered resin resembles scammony resin in odor. The special distinguishing features of the three resins are (1) the brownish color of true scammony resin, and the very deep green color which it gives with iron salts, (2) the light color of Mexican scammony resin, producing a colorless alcoholic solution, and giving almost no color with iron salts, and (3) the deep lemon-yellow color of the *Resina drastica* resin. The iron test distinguishes quite sharply between true and Mexican scammony

when a ferrous salt is used. If 0.5 g. of the resin be dissolved in 10 mils of alcohol and 0.5 mil of a 10 per cent. aqueous solution of ferrous sulfate is added, the Mexican scammony resin shows only a very faint green while the others become dark green and on standing deposit a dark mass, leaving an olive-green supernatant liquid.—*H. Kraemer.*

PHYSIOLOGY

B. M. Duggar, *Editor*

PROTOPLASM, MOTILITY

805. Harder ,Richard. **Über die Bewegung der Nostocaceen.** **[On the movement of the Nostocaceae.]** Zeitschr. Bot. 10: 177–244. 1918.—Only when poorly nourished with organic material are hormogonia active. A young hormogonium at first creeps, without rolling, in and out of the enveloping wall, later emerging in the direction of its long axis. After this, reversal usually occurs only under stimulation (mechanical obstruction or sudden change to darkness), which first produces a resting period of 1–2 minutes. Cells of a given hormogonium are independent in the secretion of mucilage (whose swelling the author thinks produces movement), in direction of movement, in time of reaction, and in perception of stimuli. This independent activity may break the hormogonia. The rate of movement varies with temperature, individuality, age, and light intensity. Tables and graphs show the magnitudes of these influences. The author presents a colloidal-swelling hypothesis to account for mechanics of movement and its direction. The mechanism of reversal is unknown.—*H. E. Pulling.*

806. Vonwiller, Paul. **Über den Bau des Plasmas der niedersten Tiere.** **[On the structure of the plasma of the lower organisms.]** Arch. Protistenk. 38: 279–323. 1918.—The article is devoted to cytological evidence on protoplasmic inclusions, vacuoles, crystals, sphaeroplasts, etc., and on the nature of the plasma membrane of rhizopods and myxomycetes, with special reference to the use and chemistry of vital stains.—*Wm. Seifriz.*

DIFFUSION, PERMEABILITY

807. Osterhout, W. J. V. **A comparative study on permeability in plants.** Jour. Gen. Physiol. 1: 299–304. 1918.—Quantitative studies on *Laminaria* (a brown alga), *Ulva* (a green alga), *Rhodomenia* (a red alga), and *Zostera* (a flowering plant) show that the behavior of these plants in respect to changes in permeability are essentially alike in all cases.—*Henry Schmitz.*

WATER RELATIONS

808. Pengelly, Margaret. **Demonstration of methods for the study of stomatal action.** Rept. Michigan Acad. Sci. 20: 154. 1918.—The three methods shown and compared were (1) Darwin's porometer (Darwin and Pertz), (2) the hygrometric paper method (Livingston and Shreve), and (3) direct examination with the microscope (F. E. Lloyd). Since method 2 is indicative of transpiration activity, and as stomatal activity does not necessarily run parallel, it is not considered as valuable as either methods 1 or 3. Method 3 is used as a check on method 2.—*R. P. Hibbard.*

MINERAL NUTRIENTS

809. Appel, M. **Über den Wert der von der Croneschen Nährlösung.** **[On the value of Crone's nutrient solution.]** Zeitschr. Bot. 10: 145–158. 1918.—Appel experimented with maize and buckwheat plants, growing them in Crone's and Pfeffer's nutrient solutions. He tested two forms of Crone's solution, one with tri-calcium phosphate and the other without it. The plants were harvested at the time of flowering and the length of the roots and shoots and that of the longest leaf were measured and dry weight was determined. Crone's solution

remained neutral during the growth period, or became slightly alkaline, and its content of ferrous salt remained almost unchanged. Pfeffer's solution was acid at the beginning of the experiment, but during the development of the plants a precipitate was formed and the solution became neutral. The amount of ferric salt in Pfeffer's solution (originally rather large) decreased and finally became nil during the growth of the plants. It was further found that plants that are but slightly sensitive to acid, such as buckwheat, thrive as well in Pfeffer's as in Crone's solution. Iron-loving plants that are at the same time sensitive to acid, such as maize, develop better in Crone's solution.—*Raf. B. Espino.*

810. Buckner, G. Davis. **The translocation of the mineral constituents of the Jack bean.** Jour. Amer. Chem. Soc. 41: 282–287. 1919.

811. Hibbard, R. P. **Salt ratios in soil cultures.** Rept. Michigan Acad. Sci. 20: 147–150. 1918.—When 3 salts KH_2PO_4, $MgSO_4$, and $Ca(NO_3)_2$ are combined in all possible ratios each varying from the other by 10 per cent increments there are 36 possible ratios. By means of auto-irrigation 36 pots of soil were maintained at optimum water content, and each was supplied with a definite ratio of the 3 salts. The soil was thus treated to determine if possible a best or optimum ratio of salts for that particular soil. In previous studies it had been possible to determine an optimum ratio in both the soil solution and distilled water cultures. The optimum ratio for wheat in a sandy loam was 4–4–3. That for a poor sandy soil, also for wheat, was 5–4–1. This study suggests a possible laboratory method for determining the fertilizer needs of a soil in a quick, reliable, scientific manner, rather than depending on long time experiments and empirical methods.—*R. P. Hibbard.*

812. Davidson, J., and J. A. LeClerc. **The effect of sodium nitrate applied at different stages of growth on yield, composition and quality of wheat.** 2. Jour. Amer. Soc. Agron. 10: 193–198. 1918.—A continuation of previous studies which includes chemical analysis of the plants. No conclusive results were obtained on the effect of $NaNO_3$ on the ash, phosphoric acid, or potash content of the grain. Nitrate applied at the second stage of the plant growth increased the protein content of both grain and straw, while potassium chloride depressed the protein content of straw.—*H. S. Reed.*

813. Dickson, James G. **The value of certain nutritive elements in the development of the oat plant.** Amer. Jour. Bot. 5: 301–324. *Fig. 1–5.* 1918.—Using Knop's standard nutrient solution, slightly modified, the author studies the effect of certain nutritive elements on growth, total dry weight, grain production, and water requirement. A deficiency in phosphorus, nitrogen, magnesium, calcium, or potassium affects each phase studied; however, the effects upon the plants of limiting the supply of phosphorus or nitrogen are much more severe and noticeable than the effects of limiting the supply of magnesium, calcium, or potassium.—*R. W. Webb.*

814. Gurlitt, Ludwiga. **Über der Einfluss der Koncentration der Nährlösung auf einige Pflanze.** [**The influence of nutrient salt concentration on certain plants.**] Beih. Bot. Centralbl. 35: 279–341. 1918.—1. The effect of concentrations of Knop's solution, from 0.1 to 4 per cent, on the form of moss protonema was observed. *Funaria* protonema growing in the lower concentrations had long thin cells, little chlorophyll, and rich growth of rhizoids. Protonema growing in the higher concentrations had spherical cells. The chlorophyll content increased with the concentration. In 0.1 per cent solutions and upward there were no rhizoids.—2. *Chenopodium rubrum*, *C. album*, *Tradescantia fluminalis*, *T. Zebrina*, *Rumex alpinus*, and other plants were grown in Knop's solution of different concentrations up to 4 per cent. It was found that the osmotic pressure of the plant cells increased with increased pressure of the solutions. The osmotic pressure of the leaves was determined plasmolytically in cells over the midvein. Tradescantia leaves showed a constant difference of about 5 atmospheres between cell pressure and solution pressure. The presssure of *Rumex* leaves increased from 17 atmospheres (grown in water) to 37 atmospheres (in 4 per cent Knop's), —a difference between cell pressures and solution pressure of from 17 to 23 atmospheres.

Chenopodium leaves showed a greatly increased osmotic pressure in the higher concentrations of Knop's solution: in water 13 atmospheres, 0.5 per cent Knop's 18 atmospheres, 1 per cent solution 29 atmospheres, 1.5 per cent solution 33 atmospheres, 2 per cent solution 41 atmospheres, 2.5 per cent solution 43 atmospheres, 3 per cent solution 58 atmospheres, 4 per cent solution 64 atmospheres.—The osmotic pressure of the roots also increased with increased pressure of the solutions in which they were growing. It was always somewhat lower than the pressure of the leaves.—It was thought that the increased pressure was due in part to an accumulation of sugar in the cells because of slow growth in the higher concentrations. —*Sophia Eckerson.*

815. Northrup, Zae. **The effect of concentrated solutions of certain magnesium salts on pyogenic and other bacteria.** Jour. Infect. Diseases 24: 170–175. 1919.—A saturated solution of $MgSO_4$ has no effect on *Stapholococcus aureus;* any concentration of $MgSO_4$ (5 per cent and more) will inhibit growth of *Streptococcus pyogenus;* a concentration of 30–45 per cent of $MgSO_4$ was required to prevent the growth of *Bacterium coli.* $MgCl_2$ had the most marked inhibitory action on the growth of all organisms used in the experiment. The Mg-ion itself is probably responsible for this action.—*Selman A. Waksman*

816. Shive, J. W., and Martin, W. H. **A comparative study of salt requirements by young and mature buckwheat plants in solution cultures.** Jour. Agr. Res. 14: 151–175. 1918. —Young and mature buckwheat plants were grown on optimum three salt solutions. The salts, potassium phosphate, calcium nitrate, and magnesium sulfate were so distributed as to include all possible sets of proportions of the three salts when the partial concentrations of the three components were made to vary by equal increments of one tenth of the total osmotic concentration. Each solution contained a trace of iron as iron sulfate. The yield of roots and tops in the different solutions are given. No definite correlation between the yield of tops and of seeds, such as there is between the yield of tops and of roots, was found.—*Henry Schmitz.*

817. Tottingham, W. E. **A preliminary study of the influence of chlorides on the growth of certain agricultural plants.** Jour. Amer. Soc. Agron. 1: 1–33. 1918.—In many cases the plants responded to the influence of chlorides by an increase in the amounts of tops, leaves, and roots. Proceeding from the observed effects of chlorides upon diastase and other enzymes which act upon carbohydrates, a tentative hypothesis is advanced to explain the varied physiological responses of plants to chlorides through the regulation of enzyme activity by these salts.—*Henry Schmitz.*

PHOTOSYNTHESIS

818. Osterhout, W. J. V., and A. R. C. Haas. **On the dynamics of photosynthesis.** Jour. Gen. Physiol. 1: 1–16. 1918.—Minute amounts of photosynthesis in marine plants can be accurately measured by adding a little phenolphthalein to sea water and observing the change in color of the indicator. In the case of fresh water aquatics bicarbonates are added. By this method it is found that *Ulva,* which has been kept in the dark, begins photosynthesis as soon as it is exposed to sunlight and that the rate steadily increases until a constant speed is attained. This fact is explained by assuming that sunlight decomposes a substance whose products either catalyze photosynthesis or enter directly into the reaction.—*Henry Schmitz.*

METABOLISM (GENERAL)

819. Cohn, E. J., S. B. Wolbach, L. J. Henderson, and P. H. Cathcart. **On the control of rope in bread.** Jour. Gen. Physiol. 1: 221–230. 1918.—A bacillus belonging to the *Bacillus mesentericus* group is found to be the possible causative organism. It is believed that by maintaining a hydrogen-ion concentration of near 10^{-6} in the bread the reaction would be sufficiently acid to prevent the development of rope.—*Henry Schmitz.*

820. FELLENBERG, TH. VON **Über den Nachweis und die Bestimmung des Methylalkohols, sein Vorkommen in den verschiedenen Nahrungsmitteln und das Verhalten der methylalkoholhaltigen Nahrungsmittel im Organismus. [The presence and method of determination of methyl alcohol, and its origin in foods.]** Biochem. Zeitschr. 85: 45–117. 1918.—Traces of methyl alcohol are found in many fruits, seeds, and plant tissues. The large amounts occurring in various fermented liquors is attributed to the decomposition of pectic substances.—*Henry Schmitz.*

821. KAPPEN, H. **Untersuchungen über Wurzelsäften. [Investigations on root sap.]** Landw. Versuchsst. 91: 1–40. 1918.—Expressed root saps were studied using (1) wheat, (3) barley, (4) oats, (5) rye, (2) dwarf bean, (7) horse bean, (8) lupine, (6) mustard, (9) buckwheat. These names are arranged in order of increasing acidity determined by titration, and numbered in order of increasing H-ion concentration. Nos. 4, 5 and 2 are alike by titration. Since H-ion concentration is very low for a molecular concentration of acid, the author concludes that the sap contains a mixture of free organic acids and their salts with strong bases (as in animals), these salts reducing acid dissociation. He questions the value of soil digestion with weak acids, as 1–2 per cent citric acid—supposed to be equivalent in dissolving power (H-ion concentration) to average roots—since 1 per cent citric acid solution has "titration-acidity" 6 times, and H-ion concentration 1500 times that of buckwheat root sap, the most acid sap found. Also, reduced dissociation of weak acids by neutral salts formed during digestion of soils, Thomas meal, etc., leads to erroneous comparative conclusions. The author thinks the characteristic acidity of a given plant is optimal for the action of its enzymes, as is known in the case of animals, so that lime-sensitive plants (really sensitive to all strong bases) are so because of reduced dissociation of acids in the sap through the action of neutral salts of strong bases. The greater the initial H-ion concentration of the sap the greater the reduction, so that the most acid plants are the most sensitive to alkalinity.—*H. E. Pulling.*

822. KYLIN, H. **Zur Kenntniss der wasserlöslichen Kohlenhydrate der Laubblätter. [The water-soluble carbohydrates of foliage leaves.]** Zeitschr. Physiol. Chem. 101: 77–88. 1918.—The amounts of soluble monosaccharides, disaccharides and polysaccharides occurring in various leaves are given.—*Henry Schmitz.*

823. KYLIN, H. **Weitere Beiträge zur Biochemie der Meeresalgen. [Biochemistry of marine algae.]** Zeitschr. Physiol. Chem. 101: 236–247. 1918.—Mannite is present in most of the brown but absent in the red and green algae. Laminarin, a complex laevo-rotary sugar which upon hydrolysis is quantitatively converted into dextrose, is isolated from the brown algae.—*Henry Schmitz.*

824. RIGG, GEORGE B. **Some energy relations of plants.** Science 48: 125–132. 1918.

825. SMALL, JAMES CRAIG. **Quantitative determination of soluble starch in the presence of starch and its hydrolytic cleavage products.** Jour. Amer. Chem. Soc. 41: 107–112. 1919.

826. SMALL, JAMES CRAIG. **A method for the preparation of soluble starch.** Jour. Amer. Chem. Soc. 41: 113–120. 1919.

827. VOEGTLIN, CARL, AND C. N. MYERS. **Phosphorous as an indicator of the "vitamine" content of corn and wheat products.** U. S. Public Health Rept. 33: 49–54. 1918.

828. VOEGTLIN, CARL, G. C. LAKE, AND C. N. MYERS. **The dietary deficiency of cereal foods with reference to their content in "antineuritic vitamine."** U. S. Public Health Rept. 33: 647–666. 1918.

829. VOEGTLIN, CARL, AND C. N. MYERS. **The growth-promoting properties of foods derived from corn and wheat.** U. S. Public Health Rept. 33: 843–868. 1918.

830. Zellner, J. **Chemische Untersuchungen über Pflanzengallen. II. [Chemical investigations of plant galls.]** Zeitschr. Physiol. Chem. 101: 255–261. 1918.—Considerable chemical differences are found between normal and gall tissue.—*Henry Schmitz.*

METABOLISM (NITROGEN RELATIONS)

831. Hesselman, Henrick. **Studier över saltpeterbildningen i naturliga jordmåner och dess betydelse i växtekologiskt åvseende. [Nitrate production in forest soils.]** Meddel. Statens Skogförsöksanst. 13-14: 297–528. 1916–17. [Received, 1918.]—Nitrification in many forest soils is as rapid as in cultivated fields. Many forest trees make greater growth in soils where nitrification is taking place than in soils where it does not. In soils in which nitrates are not found certain pines still make good growth and it is suggested that this may be due to the fact that they are able to absorb and utilize the ammonia found present in the humus.—*Henry Schmitz.*

METABOLISM (ENZYMES ACTION, FERMENTATION)

832. Cruess, W. V. **The fermentation organisms of California grapes.** Univ. California Publ., Agric. Sci. 4: 1–66. *Pl. 1–2.* 1918.—A qualitative and quantitative study of the fermentation organisms occurring on California grapes.—*Henry Schmitz.*

833. Euler, Hans. **Über die Darstellung von Kohlenhydratphosphorsäurester (Zymophosphat) durch lebende Hefe. [The formation of zymophosphate by living yeasts.]** Biochem. Zeitschr. 86: 337–342. 1918.—Two groups of yeast are recognized with respect to their power to quantitatively convert inorganic phosphorous to zymophosphates. One of these groups has this power only when in the active living state, while the other still retains it in the presence of toluol.—*Henry Schmitz.*

834. Harvey, E. N. **Studies on bioluminescence. VII. Reversibility of the photogenetic reaction in Cypridina.** Jour. Gen. Physiol. 1: 133–145. 1918.—At least three substances are concerned in light production: (1) luciferin, a body oxidizing with the production of light, dializable, and relatively resistant to heat, (2) luciferase, destroyed by boiling, non-dializable, and accelerating the oxidation of luciferin, and (3) photophelein probably acting by assisting the luciferin-luciferase reaction.—*Henry Schmitz.*

835. Harvey, E. N. **Studies on bioluminescence. IX. Chemical nature of Cypridina luciferin and Cypridina luciferase.** Jour. Gen. Physiol. 1: 269–295. 1918.—Luciferin presents many characteristics in common with proteins but doubt of its protein nature is indicated by its peculiar solubilities and its resistance to digestion by proteases. Luciferase is considered an oxidizing enzyme in a class by itself—a group having the general chemical reactions of albumins.—*Henry Schmitz.*

836. Jacoby, M. **Über Fermentbildung. [Enzyme formation.]** Biochem. Zeitschr. 86: 329–336. 1918.—Urease is formed by *Bacillus coli* when leucine is furnished the organism. The general conclusion is reached that the various substances concerned in the synthesis of proteins are also concerned in the formation of enzymes. [See Bot. Absts. 2, Entry 592.] —*Henry Schmitz.*

837. Lebert, M. **Action des sels neutres sur l'inversion du sucre par les acides. [The effect of neutral salts on the inversion of sugar by acids.]** Rév. Gén. Bot. 30: 241–244. 1918.

838. Myers, Victor C., and Anne G. Dellenbaugh. **Studies on the amylolytic activity of human saliva with a new method.** Proc. Soc. Exp. Biol. Med. 16: 18–20. 1918.

839. Waksman, S. A. **Studies on the proteolytic activities of soil microorganisms with special reference to fungi.** Jour. Bact. 5: 475–492. 1918.—The organisms were grown on Czapek's solution, and Czapek's solution in which peptone or casein was substituted for

sodium nitrate, and the relative amounts of ammonia and amino nitrogen present in the filtrate determined. A small amount of amino nitrogen and considerable ammonia accumulates in rapidly growing cultures of molds, while in slow growing cultures there is a comparatively large accumulation of amino nitrogen and little ammonia. The presence of available carbohydrates checks the accumulation of ammonia in the medium.—*Henry Schmitz.*

METABOLISM (RESPIRATION)

840. Brooks, Matilda M. **Comparative studies in respiration. III. The effect of ether on the growth and respiration of Bacillus subtilis.** Jour. Gen. Physiol. 1: 193–201. 1918.—In all of the concentrations of ether studied (from 0.037 to 7.3 per cent) there is an increase in the rate of respiration of *Bacillus subtilis* followed by a decrease. In 7.3 per cent ether in tap water there is an extraordinary increase in the output of carbon dioxide (amounting to fifty times the normal). This does not occur when 0.85 per cent sodium chloride is added, which indicates antagonism between the ether and the sodium chloride. Ether is found toxic in low and high concentrations but in the intermediate concentrations (1.1 to 3.65 per cent) there is a stimulation of growth.—*Henry Schmitz.*

841. Gustafson, F. G. **Comparative studies on respiration. II. The effect of anesthetics and other substances on the respiration of Aspergillus niger.** Jour. Gen. Physiol. 1: 181–191. 1918.—The effects of anesthetics and other substances on the respiration of *Aspergillus niger* and *Penicillium* are studied. In concentrations which are high enough to produce any effect, formaldehyde, ether, and acetone cause an increase followed by a decrease in respiration.—*Henry Schmitz.*

842. Irwin, Marian. **Comparative studies on respiration. V. The effect of ether on the production of carbon dioxide by animals.** Jour. Gen. Physiol 1: 209–220. 1918.—In general ether causes a decrease in the production of carbon dioxide by animals followed by an increase. The difference between plants and animals is found in that with the latter the increase in carbon dioxide output is accompanied by irreversible changes leading to death, while this is not necessarily the case in plants.—*Henry Schmitz.*

843. Osterhout, W. J. V. **A method of studying respiration.** Jour. Gen. Physiol. 1: 17–22. 1918.—An apparatus is described which makes it possible to measure rapidly and accurately small amounts of carbon dioxide given off by organisms of all kinds. The apparatus can also be used to measure photosynthesis.—*Henry Schmitz.*

844. Osterhout, W. J. V. **An indicator method of measuring the consumption of oxygen.** Jour. Gen. Physiol. 1: 167–171. 1918.—The use of the blood of the horse shoe crab (*Limulus*) which turns blue when oxygen is absorbed and becomes colorless when reduced is suggested as an indicator method of measuring the consumption of oxygen in certain organisms.—*Henry Schmitz.*

845. Osterhout, W. J. V. **Comparative studies in respiration. I. Introduction.** Jour Gen. Phys. 1: 171–179. 1918.—A series of investigations with improved quantitative methods has been commenced. The results of the first of these show that when anesthetics are employed in sufficient concentration to produce any result, plants show a rise in respiration followed by a fall. In the animals studied the rise (found in the higher concentrations only) was preceded by a temporary fall which was not entirely due to lowering of muscular activity or tonus. In lower concentrations the effect upon animals was merely a decrease in respiration.—*Henry Schmitz.*

846. Thomas, Helen S. **Comparative studies in respiration. IV. The effect of ether on the respiration of wheat.** Jour. Gen. Physiol. 1: 203–207. 1918.—An increase of respiration followed by a decrease is produced by a concentration of from 7.3 to 3.65 per cent ether on wheat.—*Henry Schmitz.*

ORGANISM AS A WHOLE

847. Fellers, C. L. **The effect of inoculation, fertilizer treatment and certain minerals on the yield, composition and nodule formation of soy beans.** Soil Science 6: 81–119. *Pl. 1–5.* 1918.—Experimental methods are given in detail and the results show that the composition and the nodule formation of soy beans may be influenced by all factors mentioned in the title.—*R. W. Webb.*

848. Fellers, C. R. **Report on the examination of commercial cultures of legume—infesting bacteria.** Soil Science 6: 53–67. 1918.—The purity and vitality of many commercial cultures were found to be good. Soy beans were less successfully inoculated than most other legumes. Soil or muck cultures proved to be excellent carriers of soil bacteria.—*R. W. Webb.*

849. Gillespie, Louis J., and Lewis A. Hurst. **Hydrogen-ion concentration—soil type—common potato scab.** Soil Science 6: 219–236. *Fig. 1–3.* 1918.—Using colorimetric and electrometric methods the hydrogen-ion concentration of many soils was determined with the result that excellent correlation is established between hydrogen-ion concentration and occurrence of potato scab. Exponents below 5.2 are related to little or no scab, while higher exponents are generally indicative of scab prevalence. [See Bot. Absts. 1, Entry 1617.]—*R. W. Webb.*

850. Newcombe, F. C. **Behavior of plants in unventilated chambers.** Rept. Michigan Acad. 20: 145–146. 1918.—In this study covering a period of three years and the employment of more than 2000 plants, there appeared no constant appreciable differences in the rate of growth, the dropping of leaves, and the falling over of the plants when control plants were compared with plants growing in unventilated chambers. All experiments were carried on in the dark because of the impossibility of keeping constant temperature in the light. In regard to responses to geotropism and heliotropism in moving and stagnant air, no differences could be determined in the time of response or in the angle of curvature. The plants were generally seedlings of field corn, pop-corn, wheat, buckwheat, radish, white mustard, castor bean, pumpkin, garden pea, kidney bean, Windsor broad bean, white lupine and sweet pea. Plants were kept in the experimental condition usually for from four to ten days.—*H. P. Hibbard.*

851. Newcombe, F. C., and Etta A. Bowerman. **Behavior of plants in unventilated chambers.** Amer. Jour. Bot. 5: 284–294. 1918.—Various plants growing in quiet and in moving air were studied, but observations and measurements showed very slight differences between the plants raised under the two conditions.—*R. W. Webb.*

852. Noyes, H. A., and C. O. Cromer. **Tests of commercial cultures for legume inoculation.** Soil Science 6: 69–77. *Pl. 1.* 1918.—Soil and commercial cultures were equally efficient in inoculation, each giving 100 per cent. Increased quantities of soil do not increase the inoculations, whereas larger quantities of commercial cultures do. Fertilization with nitrate of soda tended to reduce the percentage of inoculations.—*R. W. Webb.*

853. Pringsheim, Ernst G. **Zur Physiologie endophytischer Cyanophyceen. [The physiology of endophytic Cyanophyceae.]** Arch. Protistenk. 38: 127–130. 1918.—*Nostoc punctiforme* from *Cycas* and *Gunnera*, and also *Anabaena Azollae* from *Azolla*, can be made to reproduce outside of the host plant. They are capable of autotrophic nourishment in nutrient solutions such as are generally used for algae. Increased growth through consumption of organic substances was noticeable only in *Nostoc*, in which such consumption could, to a certain degree, replace carbon dioxide assimilation. Nitrogen fixation was not observed.—*Wm. Seifriz.*

854. Young, R. T. **The relation of rhythms and endomixis, their periodicity and synchronism in Paramecium aurelia.** Biol. Bull. 35: 38–47. 1918.

GROWTH, DEVELOPMENT, REPRODUCTION

855. LEVIN, ISSAC, AND MICHAEL LEVINE. **Malignancy of the crown gall and its analogy to animal cancer.** Proc. Soc. Exp. Biol. Med. 16: 21–22. 1918.—See Bot. Absts. 2, Entry 106.

856. MELLSTRÖM, GÖSTA. **Skogsträdens frösättning år 1916. [Seed production of forest trees.]** Meddel. Statens Skogs-försöksanst. 13–14: 167–168. 1916–17. [Received 1918.]—The general conclusion is reached that after an adverse winter forest trees produce few flowers and still fewer seeds.—*Henry Schmitz.*

GERMINATION, RENEWAL OF ACTIVITY

857. BRYAN, W. E. **Hastening the germination of Bermuda grass seed by the sulfuric acid treatment.** Jour. Amer. Soc. Agron. 10: 279–281. 1918.—A method is described for obtaining promptly a higher percentage of seed germination. Seeds were immersed in strong sulfuric acid for periods of 5 to 60 minutes, washed, and transferred to moist blotting paper. The best results followed an acid treatment for 10 minutes.—*H. S. Reed.*

REGENERATION

858. LOEB, J. **The law controlling the quantity of regeneration in the stem of Bryophyllum calycinum.** Jour. Gen. Phys. 1: 81–96. 1918.—A method is given which allows the measurement of the influence of the mass of a leaf upon the quantity of shoots regenerated in an isolated piece of stem. The results indicate that the mass of shoots regenerated at the apex of such a piece of stem increases under equal conditions and equal time with the mass of the leaf and is approximately proportional to the mass of the leaf.—*Henry Schmitz.*

859. LOEB, J. **The physiological basis of morphological polarity in regeneration.** Jour. Gen Physiol. 1: 337–362. 1918.—1. The leaves of *Bryophyllum calycinum* exert an inhibitory influence on shoot formation. The inhibitory influence can be diminished or be made to disappear when the mass of leaf is reduced below a certain limit. The possibility that the inhibitory influence of the leaf upon shoot formation is due to inhibitory substances secreted by the leaf and carried by the sap from the leaf towards the base of the stem is suggested.—*Henry Schmitz.*

TEMPERATURE RELATIONS

860. BEHRE, ELLINOR H. **An experimental study of acclimation to temperature in Planaria dorotocephala.** Marine Biol. Bull. 35: 277–317. 1918.

861. BOVIE, W. T., AND ALICE KLEIN. **Sensitization to heat due to exposure to light of short wave lengths.** Jour. Gen. Physiol. 1: 331–336. 1918.—Paramecia which have been exposed to fluorite radiation are so highly sensitized to heat that they are unable to withstand even for sixty seconds, temperatures which are optimum for non-radiated plants.—*Henry Schmitz.*

862. HOSKINS, M. M. **Further experiments on the effect of heat on the eggs of Cumingia.** Marine Biol. Bull. 35: 260–276. *Pl. 1–2.* 1918.

863. KOTILA, J. E. **Frost injury of potato tubers.** Rept. Michigan Acad. Sci. 20: 451–459. 1918.—This is a statement of the various forms of frost injury and the great money loss sustained, and an account of the experimental production of various spottings and internal discolorations of tubers under control conditions.—*R. P. Hibbard.*

864. LAUGHLIN, H. H. **The dynamics of cell-division.** Proc. Soc. Exp. Biol. Med. 15: 117–122. 1918.—Study of dynamics of mitosis has lagged behind that of structural phases. Time relations of mitosis must be studied under different environments. A study is reported

the object of which was to determine the effect of increase in temperature of 10° above 10°C. and above 20°C. respectively on mitosis in onion root tips. The temperature coefficient, or Q_{10}, for the entire cell cycle in the two cases, respectively, is found to be +1.2139 and +2.6218. The increase from 10°C. to 20°C. thus only accelerates mitosis slightly, whereas an increase from 20°C. to 30°C. more than doubles the speed of cell division. The author lists 20 physical, chemical and physiological processes which increase in speed with rise in temperature between 5°C. and 35°C., 10 which decrease, and 6 which may do either according to conditions. He concludes that mitosis is not the sum total of continuous and independent physiological actions, but an interrelated system of vastly complex forces.—*C. H. Farr.*

865. Osterhout, W. J. V., and A. R. C. Haas. **The temperature coefficient of photosynthesis.** Jour. Gen. Physiol. 1: 295–298. 1918.—The temperature coefficient of photosynthesis in *Ulva* (between 17 and 27°C.) is 1.81. This may be explained by assuming that the process involves a light reaction with a low coefficient followed by an ordinary reaction with a high coefficient.—*Henry Schmitz.*

RADIANT ENERGY RELATIONS

866. Bovie, W. T., and D. M. Hughes. **Rate of recovery from the action of fluorite rays.** Jour. Gen. Physiol. 1: 323–329. 1918.—Some experiments on the rate of recovery of *Paramecium caudatum* from the cytolytic action of fluorite rays are reported.—*Henry Schmitz.*

867. Brooks, S. C. **Complement destruction as a measure of the effects of radiation.** Jour. Med. Res. N. S. 33: 345–351. 1918.—Attempting to secure indications regarding the initial changes produced in protoplasm by exposure to light the author employed a 2 per cent solution of guinea pig serum in .85 per cent sodium chloride, exposing the complement in a layer 11 mm. deep in a quartz tube 8.5 cm. from a mercury vapor arc. The complementing power was estimated by the hemolysis of sheep erythrocytes sensitized with several units of anti-sheep rabbit serum, and the grade of hemolysis ultimately measured colorimetrically. The results indicate a loss of complementing power, after radiating ten minutes, and no spontaneous recovery occurs.—*B. M. Duggar.*

868. Hecht, Selig. **The photic sensibility of Ciona intestinalis.** Jour. Gen. Physiol. 1: 147–166. 1918.—The results obtained with regularly repeated stimulation not only fail to show any basis for a "learning" process, or for the presence of a "higher behavior," but follow the requirements of a photochemical reaction.—*Henry Schmitz.*

TOXIC AGENTS

869. Brooks, S. C. **A theory of the mechanism of disinfection, hemolysis, and similar processes.** Jour. Gen. Physiol. 1: 61–80. 1918.—The various theories are discussed and found inadequate, and another is suggested. It is held that the course of processes like disinfection is the result of two factors; the frequency curve of variation in individual resistance, which may be different for each group of cells and each toxic agent; and the course of the fundamental reaction, which usually proceeds with a velocity diminishing during the experiment at a rate dependent on the particular conditions prevailing.—*Henry Schmitz.*

870. Cook, F. C., and J. B. Wilson. **Boron: Its effect on crops and its distribution in plants and soils in different parts of the United States.** Jour. Agric. Res. 13: 451–470. 1918.—Borax or colemanite mixed with horse manure had no effect on the growth or yield of wheat or barley. A decided difference is found in the capacity of soils to render boron nontoxic to plants.—*Henry Schmitz.*

871. Goodspeed, T. H., J. M. McGee, and R. W. Hodgson. **Note on the effects of illuminating gas and its constituents in causing abscission of flowers in Nicotiana and Citrus.** Univ. California Publ. Bot. 5: 439–450. 1918.—Illuminating gas causes premature abscission, though the response may vary according to variety or species. The constituents of the gas, carbon-monoxide, carbon dioxide, and ethylene, all exert the same effect.—*R. W. Webb.*

872. HARRIS, F. S., AND D. W. PITTMAN. **Soil factors affecting the toxicity of alkali.** Jour. Agric. Res. 13: 287–319. 1918.—The size of particles of sand, independent of other factors seems appreciably to influence the toxicity of alkali. Coarse loams, however, are more tolerant than the finer ones at the same moisture content. In general, soils with high water-holding capacity are more tolerant to alkali than those having a low water-holding capacity.—*Henry Schmitz.*

873. MACHT, D. I., AND D. E. NELSON. **On the antiseptic action of benzyl alcohol.** Proc. Soc. Exp. Biol. Med. 16: 25–26. 1918.

874. PACKARD, C. **Difference in the action of radium on green plants in the presence and absence of light.** Jour. Gen. Physiol. 1: 37–38. 1918.—The effect of radium in causing the disintegration of *Spirogyra* and *Volvox* cells is much more pronounced in the dark than when the plants are exposed to light.—*Henry Schmitz.*

875. PACKARD, CHARLES. **The effect of radium radiations on the development of Chaetopterus.** Marine Biol. Bull. 35: 50–70. *Pl. 1–2.* 1918.

876. STEINBERG, R. A. **A study of some factors influencing the stimulative action of zinc sulfate on the growth of Aspergillus niger. II. A comparison of two strains of the fungus.** Bull. Torrey Bot. Club. 46: 1–21. *Pl. 1.* 1919.—The discrepancies existing between the results reported by various investigators for the stimulative action of zinc sulphate on the growth of *Aspergillus niger* are two great to be laid to experimental errors. Two one-spore strains of this fungus were isolated, one showing no pigment and the other the maximum amount of yellow pigment in the hyphae; the former was called W, and the latter Y. The existence of quantitative difference in the growth of the two strains was marked from the first, both with and without zinc, and it was demonstrated that a higher concentration of zinc was necessary to obtain the maximum yield for the W strain than for the Y. Both strains showed in time a decrease in the effect of the action of suboptimal zinc concentrations. The progressive modification of the growth capacity was scarcely manifest in the higher zinc concentrations. The assumption was made that this gradual change in the strains was due to the "non-addition of organic salts to the peptone-sucrose agar used for the stock cultures." Transfers were made to an agar medium containing such salts and cultured for three generations, then used for inoculating bread cultures and these in turn for Pfeffer solution. No modification of the two strains was evident in so far as the yield obtained was concerned. Experiments with various media seemed to show that the assumption that the decrease in yield was due to the impoverishing of the spores in some essential ash constituent was improbable. Throughout, however, the maximum yield of about 1 gram per 50 cc. of medium was obtained when the proper amount of zinc was added. The fact that the decrease in yield was most conspicuous when little or no zinc was added suggested that the "zinc-free" media were not entirely so. It seems that the differences existing in the literature between the results recorded by different investigators can, in part at least, be attributed to the use of strains having different "zinc optima."—*P. A. Munz.*

MISCELLANEOUS

877. LOEB, JACQUES. **The influence of neutral salts upon the viscosity of gelatin solutions.** Jour. Biol. Chem. 34: 395–413. 1918.

878. LOEB, J. **Amphoteric colloids. I. Chemical influence of hydrogen ion concentration.** Jour. Gen. Physiol. 1: 39–60. 1918.—The experiments suggest that the theory of amphoteric colloids in its general features is identical with the theory of inorganic hydroxides whose behavior is adequately understood on the basis of the laws of general chemistry.—*Henry Schmitz.*

879. LOEB, J. **Amphoteric colloids. II. Volumetric analysis of ion-protein compounds; the significance of the isoelectric point for the purification of amphoteric colloids.** Jour. Gen. Physiol. 1: 237–254. 1918.—It is shown by volumetric analysis that on the alkaline side from the isoelectric point gelatine combines with cations only, that on the more acid side from its isoelectric point it combines with anions, but not with cations, and at the isoelectric point (P. h. 4.7.) it combines with neither anion nor cation. It is suggested that the simplest method of obtaining amphoteric colloids approximately free from inorganic impurities would seem to consist of bringing them to the hydrogen ion concentration characteristic of their isoelectric point.—*Henry Schmitz.*

880. LOEB, J. **Amphoteric colloids. III. Chemical basis of the influence of acid upon the physical properties of gelatin.** Jour. Gen. Physiol. 1: 363–385. 1919.—The influence of acid upon the physical properties of gelatin is based on the fact that gelatin is an amphoteric electrolyte, which at its isoelectric point is but sparingly soluble in water, while its transformation into a salt with a univalent anion like bromine makes it soluble.—*Henry Schmitz.*

881. MACMILLAN, H. G. **Sunscald of beans.** Jour. Agric. Res. 13: 647–650. *Pl. 64–66.* 1918.

882. WATSON, E. E. **Relation between habitat and structure in Pteris aquilina.** Rept. Michigan Acad. Sci. 20: 246. 1918.—Microscopical examination of sections of frond, petiole and rhizome of plants from diverse habitats reveal structural differences as to cell size and number of stomata in the leaf and as to amount of interfascicular mechanical tissue in the petiole. There are no observable structural differences in the rhizome. [See Bot. Absts. 2, Entry 739.]—*R. P. Hibbard.*

883. KITCHEN, P. C. **The relation between the structures of some coniferous woods and their penetration by preservatives.** Rept. Michigan Acad. Sci. 20: 203–221. *Pl. 11–12.* 1918.—*Larix laricina* and *Larix occidentalis* are very similar in most of their characters and why the former is more difficultly penetrable to creosote oil was not understood until a microscopical examination of the structures most concerned in the passage of the oil was made. The seeming paradox in penetration, upon close examination of the bordered pit structures, is explained by a difference in "penetrable bordered pit areas." [See Bot. Absts. 2, Entry 746.] —*R. P. Hibbard.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

884. DE CANDOLLE, CASIMIR. **Piperaceae a Jaheri in insulis Key collectae. [Piperaceae collected by Jaheri on the Key Islands.]** Meded. van's Rijks Herb. Leiden. No. 32: 1–2. 1918. —Five species are recorded of which the following are new to science: *Piper subepunctatum, P. oblongibracteum,* and *P. keyanum.*—*J. M. Greenman.*

885. HALLIER, HANS. **Ueber Aublet's Gattungen unsicherer oder unbekannter Stellung und über pflanzengeschichtliche Beziehungen zwischen Amerika und Afrika. [On the position of doubtful or unknown genera of Aublet and on the plant-historical relations between America and Africa.]** Meded. van's Rijks Herb. Leiden No. 35: 1–33. 1918.—The author discusses in some detail about fifteen genera which were published by Aublet in the "Historie des plantes de la Guiane françoise" in 1775. The position of these genera in the natural system of classification has remained for many years in doubt. According to Hallier *Pacouria* Aubl. = *Landolphia* Beauv., *Sagonea* Aubl. = *Hydrolea* L., *Guapira* Aubl. = *Pisonia* L., *Licaria* Aubl. = *Octea* Aubl., *Managa* Aubl. = *Salacia* L., *Senapea* Aubl. = *Passiflora* L., *Voyara* Aubl. = *Capparis* L., *Courimari* Aubl. = *Sloanea* L., and *Tampoa* Aubl. = *Salacia* L.—*J. M. Greenman.*

886. HALLIER, HANS. **Ueber Patrick Browne's Gattungen zweifelhafter Stellung. [On Patrick Browne's genera of doubtful position.]** Meded. van's Rijks Herb. Leiden No. 36: 1–6. 1918.—Certain genera published by Patrick Browne in "History of Jamaica," 1756, are discussed. According to Hallier *Catonia* P. Br. = *Miconia* Ruiz & Pav., *Collococcus* P. Br. = *Cordia* L., *Chloroxylum* P. Br. = *Zizyphus* Adans, *Ateramnus* P. Br. *Hippomane* L., and "*Vimen*" P. Br. = *Hyperbaena* Miers.—*J. M. Greenman.*

887. HALLIER, HANS. **Die botanischen Ergebnisse der Elbert'schen Sunda-Expedition des Frankfurter Vereins für geographie und Statistik, III. [The botanical results of the Elbert Sunda-Expedition of the Frankfurt Society for Geography and Statistics.]** Meded. van's Rijks Herb. Leiden No. 37: 1–92. 1918.—The present article contains not only a report on the plants collected by Elbert in the Dutch East Indies, but it includes descriptions of new species from allied floral regions and notes on the geographical distribution of species of wide occurrence in the tropics. The following new species and new combinations are included: *Astilbe apoënsis*, *A. khasiana*, *Daphniphyllum buchananiifolium*, *D. papuanum*, *Bucklandia tricuspis*. (*Liquidambar tricuspis* Miq.), *Buxus nitidus* (*Austrobuxus nitidus* Miq.), *Geunsia grandiflora*, *G. quaternifolia*, *G. subternata*, *G. homoeophylla*, *G. serrulata*, *G. anisophylla*, *G. cinnamomea*, *Vitex padangensis*, *V. Cofassus* Reinw. var. *timorensis*, *V. Cofassus* Reinw. subvar. *pubescens*, *V. leptobotrys*, *V. secundiflora*, *V. flabelliflora*, *V. lasiantha*, *V. subspicata*, *V. tetragona*, *Mastixia premnoides* (*Vitex premnoides* Elm.), *Gmelina glandulosa*, *Clerodendrum viscosum* Vent. var. *nilagirica*, *C. confusum*, *C. adenophysum*, *C. catalpifolium*, *C. brunfelsiiflorum*, *C. haematolasium*, *C. macrophyllum* Bl. var. *sinuatolobata*, *C. barbafelis*, *C. Hettae*, *C. Elberti*, *Petreovitex ternata*, *Sphenodesme Winkleri*, and *Avicennia Rumphiana*.—*J. M. Greenman.*

888. HENRARD, J. TH., AND A. THELLUNG. **Leipdium flavum Torrey var. apterum nob.** Meded. van's Rijks Herb. Leiden No. 34: 1–2. *1 text fig.* 1918.—*Lepidium flavum* Torr. var. *apterum* is described as a new variety from San Bernardino County, California.—*J. M. Greenman.*

889. [HERZOG, TH.] **Die von Dr. Th. Herzog auf seiner zweiten Reise durch Bolivien in den Jahren 1910 und 1911 gesammelten Pflanzen. Teil IV. [The plants collected by Dr. Th. Herzog on his seond journey through Bolivia in the years 1910 and 1911. Part IV.]** Meded. van's Rijks Herb. Leiden No. 33: 1–19. 1918.—This article consists primarily of a reprint from Engler's Bot. Jahrb. 54: Beiblatt No. 118. of Krause's contribution on the Loranthaceae and Gilg's contribution on the Gentianaceae.—*J. M. Greenman.*

890. KOIDZUMI, B. **A new species of Cherry tree.** Bot. Mag. Tôkyô 32: 54. 1918.—Koidzumi describes the following species as new to science: *Prunus kiusiana*.—*T. Matsumoto.*

891. MATSUDA, SADAHISA. **Notes on Rehmannia found in China, Manchuria, and Korea.** [Article in Japanese.] Bot. Mag. Tôkyô 32: 140–142. 1918.—Five species and a few varieties are reported of which one variety is described as new to science. This variety was first described by T. Makino as new to science in "Zotei Somoku Zusetsu," Vol. III, 861, but no name was given by him. Matsuda proposes the name of *R. glutinosa Libosch*, var. *Makinoi*.—*T. Matsumoto.*

892. NAKAI, TAKENOSHIN. **Notes on wild cinnamon tree found in Ogasawara, Japan.** [Article in Japanese.] Bot. Mag. Tôkyô 32: 178. 1918.—The author states that *Cinnamomum pseudopedunclatum* Hayata is identical with *C. Loureirii* var. *scrobiculatum* Meisn. and proposes the name of *C. scrobiculatum* (Meisn.) Nakai for this species.—*T. Matsumoto.*

893. SWINGLE, WALTER T. **Merrilia, a new Rutaceous genus of the tribe Citreae from the Malay Peninsula.** Philippine Jour. Sci. Bot. 13: 335–343. *Pl. 5–6.* 1918.—*Merrillia*, a new genus of the Rutaceae, is described and illustrated. The genus is based on *Murraya caloxylon* Ridley and is native in southern Siam.—*J. M. Greenman.*

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ENTRIES 894–1161

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

894. REIDY, MARGARET M. **Ecology.** School Sci. Math. 19: 131–134. Feb., 1919.—To survive, plants and animals must solve the problems of food and protection. Adaptations of insects and flowers are of special interest. The sumach fruits afford food and shelter for many insects. The carpenter bee excavates pith of sumach. Other similar cases furnish topics of great interest for high schools.—*A. Gundersen.*

895. VAN CLEAVE, H. J. **The field excursion in high school biological courses.** School Sci. Math. 19: 7–10. Jan., 1919.—Definiteness of object is very essential. Object must be distinctly limited, as "Insects as carriers of pollen," "Birds as carriers of seeds."—*A. Gundersen.*

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

896. ALWAY, F. J., G. R. McDOLE, AND R. S. TRUMBULL. **Relation of minimum moisture content of subsoil of prairies to hygroscopic coefficient.** Bot. Gaz. 67: 185–207. Mar., 1919.—Soil moisture studies were carried out on the prairies of Nebraska both in the semi-arid parts of the state dominated by the short-grass and in the more humid portions near Lincoln characterized by the prairie-grass associations. Samples were taken at intervals over a 6-year period at different depths and the water content and hygroscopic coefficient determined, the moisture conditions being expressed as the ratio of these two findings. This ratio gives not only the relative moistness but also indicates whether free water or growth water is present. The subsoils of the semi-arid regions were found to be persistently dry, the ratio ranging from 1.5 to 1.1 and after droughts decreasing to 1.0 to depths of 6–12 feet. Even extreme and prolonged droughts brought no further reduction or moisture content. Humid prairies showed no reduction of moisture content in their subsoil during drought to a greater depth than 5 feet, the deeper subsoil exhibiting a ratio of 2.0 to 2.4. The dry condition of the subsoil in the semi-arid portions is attributed to the presence of perennials with a root range of 15 feet or more, similar plants being absent or few in the more humid regions. In the arid portions during wet periods following droughts the upper moistened portion of the subsoil will be isolated from any deeper lying moist layer by a zone in which the subsoil is too dry to permit the penetration of plant roots.—*Geo. D. Fuller.*

897. Benecke, W. **Pflanzen und Nachtschnecken. [Plants and Slugs.]** Flora 111, 112: 450–477. 1918.—In a paper primarily zoological in content, author divided slugs according to their food preference into pleophagous, herbivorous, and mycophagous species. When offered agar disks saturated with certain food substances, pleophagous species ate either sugar or proteid disks, mycophagous species preferred peptone agar, and herbivorous forms sugar agar. Glycogen, which occurs in certain fungi, was an attraction to two species, while mannite had no effect. Both pleophagous and mycophagous species ate many species of agarics, but not all species tried. Several species, notably acrid forms of Russula and Lactarius, were eaten more readily by mycopahgous slugs. Several species poisonous to man, including *Amanita muscaria* and *A. phalloides*, were eaten readily. The author accepts Stahl's old conclusion that many plants are protected against slugs by their mechanical properties, but does not know whether mechanical devices are of equal efficiency against all three food-classes.—*H. A. Gleason.*

898. Betts, M. Winifred. **Notes on the autocology of certain plants of the Peridotite Belt, Nelson. Part I—Structure of some of the Plants.** (No. 1). Trans. New Zealand Inst. 50: 230–243. *15 fig.* June, 1918.—This is the initial number of a series of short papers to describe the anatomy of a number of representative plants of the Mineral Belt. These plants belong to three principal associations: (1) Shrubland, (2) Open Scrubland and (3) Tussock Grassland. Nine plants are considered in this paper and the description of leaf and stem anatomy together with growth-form is given.—*P. D. Strausbaugh.*

899. Diels, L. **Über Wurzelkork bei Pflanzen stark erwärmter Boden. [Periderm in plants of heated soils.]** Flora 111, 112: 490–502. *3 fig.* 1918.—Author describes the structures appearing at or near the surface of the ground on various species of Australian xerophytes. These include a copious development of scales or hairs, very lacunar cortex, and conspicuous development of the periderm. Without denying the effect of such structures in reducing transpiration, he infers that they are of chief value as insulation against the superheating of tissues from contact with the hot soil, which probably reaches temperatures of 55–65°. He made no measurements of actual soil temperatures nor of the internal temperature of the plants with these structures.—*H. A. Gleason.*

900. Dufrenoy, J. **Les conditions écologiques du développement des champignons parasites.—Étude de géographie botanique. [Ecological conditions in the development of parasitic fungi.]** Bull. Soc. Mycol. France 34: 8–26. June, 1918.—A comparison of collections made at elevations at 1200 to 2000 m. in the Pyrenees with those listed by Fragoso for Cataluna, Spain. Most of the fungous diseases found in Cataluna have been found in Barèges. The Pyrenees are not a barrier to the dissemination of the fungi.—There exists, however, certain differences between the French and Spanish floras. They are for the most part explained by lack of data on the mycological flora of the Pyrenees. 18 of the 25 rusts found in Barèges are reported by Fragoso for Cataluna but Fragoso does not record *Puccinia simplex* on barley, or *Melampsorella caryophylleum* on fir.—A study of the distribution in altitude of fungous diseases leads to the conclusion that there exists among parasitic fungi, species of the plain, species of the mountains and species occurring indifferently. The factor determining the specialization seems to be not temperature nor humidity but radiation. The species of the plain slightly pigmented, cannot stand the intense radiation of high altitudes. The species of the mountains have strongly colored spores or are protected by the color reaction of the host.—Any influence of altitude on the occurrence of fungous diseases depends on internal unknown factors in each host, and if the host is modified in its susceptibility, it has not been determined.—There is a short chapter on biotic factors and fungous parasites in which is discussed fungi attacking other fungi and fungi attacking insects.—*D. Reddick.*

901. Fuller, George D., and A. L. Bakke. **Raunkiaer's "Life forms," "leaf-size classes," and statistical methods.** Plant World 21: 25–37, 57–63. Feb., Mar., 1918. [Translations of two papers: Raunkiaer, C. **Om Bladstorrelsens Anvendelse i den biologiske Plantegeografi.**

Bot. Tidskr. 33: 225–240. 1916. RAUNKIAER, C. **Om Valensmetoden.** Bot. Tidskr. 34: 304–311. 1917.] The importance of leaf size in relation to environment is discussed. Phanerophytes (tall woody plants) are subdivided by the author into six classes with leaf sizes between the limits given: leptophylls (less than 25 sq. mm.), nanophylls (below 225 sq. mm.) microphylls (2025 sq. mm.), mesophylls (18,225 sq. mm.), macrophylls (164,025 sq. mm.), megaphylls (above last figure). This classification may also be applied to chamaephytes. Its use is shown to give more exact results to statistical studies of vegetation.—The valence method provides the means of determining the biological spectrum in a manner that takes account of the relative frequency and areal extent of the plants of the several life forms.—*Forrest Shreve.*

902. HARPER, R. M. **Some dynamic studies of Long Island vegetation.** Plant World 21: 38–46. 1918.—The herbaceous vegetation was removed from one square yard in each of seven grass formations, and determinations were made of net weight, dry weight and ash.—The greatest dry weights and weights of ash were shown by **Phragmites** and **Typha**, the lowest by grasses of the Hempstead Plains. Comparisons are made with similar work in other regions.—*Forrest Shreve.*

903. HARPER, ROLAND M. **A phytogeographical sketch of southern Maryland.** Jour. Washington Acad. Sci. 8: 581–589. Nov., 1918.—In his study of this area the author has divided it into 5 separate divisions; (1) the fall-line clay hills, (2) the green sand belt, (3) the bay shore hills, (4) the Brandywine plateau, and (5) the St. Mary's region. These regions are described separately and a list of the commonest trees found in each is given with brief notes concerning the shrubs and herbaceous forms. [See Bot. Absts. 1, Entry 1153.]—*P. D. Strausbaugh.*

904. HARPER, ROLAND M. **A new seasonal precipitation factor of interest to geographers and agriculturists.** Science 48: 208–211. Aug., 1918.—A brief description is given of a new precipitation map of the United States which indicates the regions receiving an early summer rainfall on the one hand, and those characterized by late summer rainfall on the other. The author uses this map as a basis in pointing out certain correlations between this distribution factor and the soils, and also the vegetation types associated with these soils. [Abst. in Exp. Sta. Rec. 39: 511. 1918.]—*P. D. Strausbaugh.*

905. KEARNEY, THOMAS H. **Plant life on saline soils.** Jour. Washington Acad. Sci. 8: 109–125. Mar., 1918.—A general review of the more important facts concerning halophytic vegetation. Among other things the author discusses the distribution, structure and water economy of halophytes; osmotic pressure in roots and leaves, salt content of the tissues and the importance of sodium to halophytes and in plant nutrition in general. [Rev. by MACDOUGAL, calling attention to bibliographic omissions, in: Plant World 21: 161. 1918.]—*P. D. Strausbaugh.*

906. MACCAUGHEY, VAUGHAN. **An endemic Begonia of Hawaii.** Bot. Gaz. 66: 273–275. Sept., 1918.—The Begoniaceae are almost entirely without representatives in the Pacific region, their greatest display being in the Andean portion of South America as far north as Mexico, and in the Himalayas extending southwest to the Malay Peninsula. Two of the four genera are monotypic; one of these, Symbegonia, occurs in New Guinea, and the other, Hillebrandia, is found only in Hawaii. The presence of this endemic form, *Hillebrandia sandwicensis*, in the Hawaiian flora furnishes additional evidence that "at one time in the history of the Pacific Basin the Hawaiian Islands were much more closely associated with the Andean and South Pacific regions than they are at present." This endemic species lives in shady places near water-falls or in the depths of shaded ravines, with an altitudinal range of from 3000–6000 feet.—*P. D. Strausbaugh.*

907. MACDOUGAL, D. T. [Rev. of: KEARNEY, T. H. **Plant life in saline soils.** Jour. Washington [D. C.] Acad. Sci. 8: 109–125. Mar., 1918.—(See Bot. Absts. 2, Entry 905.)] Plant World 21: 161. 1918.

908. Ostenfeld, C. H. **Stray notes from the tropical West Australia.** Dansk. Botanisk. Arkiv. 2: 1–29. *9 fig., 3 pl.* 1918.—This account is based on observations made during hasty visits at five of the ports and deals with the vegetation of the coastal region only. Five formations are mentioned and described: (1) the mangrove formation; (2) the sandy sea-shore formation; (3) the salt pan formation; (4) the sand dune formation, and (5) the savannah forest. A list of the species collected is appended.—*P. D. Strausbaugh.*

909. Robbins, W. W. **Successions of vegetation in Boulder Park, Colorado.** Bot. Gaz. 65: 493–525. *14 fig.* June, 1918.—Two successions are described; one, a hydrarch succession associated with the glacial lakes and the silt-sand flood plains; the other, a xerarch succession involving the level, gravel areas exposed by the rapid drainage of the old glacial lake which formerly covered the major portion of the Park, and the flood plains of coarser materials such as small boulders and coarse gravel. In the hydrarch succession the initial stage is an Eleocharis-Ranunculus association followed by the sedge moor; this gives place to the willow thicket which in turn is followed by meadow grassland or meadow scrub. This succession is best observed on the borders of the oxbow lakes. This meadow culmination is regarded as a temporary climax only. The cobblestone flood plains represent a habitat characterized by rather extreme conditions of temperature and moisture supply. The initial stage is xerophytic consisting of a few plants including mosses, struggling to establish themselves in the loose sediment between the stones. This is followed by a mixed community that gives way to the willow thicket followed by the meadow scrub. The willow thicket may be succeeded by sedge moor which sometimes remains for a long period. "The seasonal aspects of the sedge moor change slowly" owing to the fact that species are relatively few and the dominance of Carex conceals the other forms. Even more important are the soil, temperature and moisture factors which show the least seasonal fluctuation in this stage. "Edaphic conditions within a community control the seasonal changes of the vegetative covering." Lichens and *Selaginella densa* take first possession of the glacial gravels and are followed by a mixture of xerophytic forms and the incoming of grasses passing at once into the characteristic "dry grassland" of these areas. Dry grassland has all appearances of being the culminating stage but "the combined activities of biotic and physiographic factors are resulting in the slow disappearance of the dry grassland and the establishment thereupon of a mesophytic grassland." Though the Park is fringed by three forest associations there is no evidence of invasion of the meadow by trees due to the fact that the extreme conditions of exposure in these areas make it very difficult for three seedlings to acquire a foothold. The author makes note of the scarcity of aquatic plant life in the lakes and ponds of the region and believes that the paucity is due in part to the coldness of the waters, and in part to the absence of necessary salts from the very soft water of these lakes.—*P. D. Strausbaugh.*

910. Robertson, Charles. **Pollination of Asclepias cryptoceras.** Bot. Gaz. 66: 177. Aug., 1918.—A brief query concerning mode of pollination in Asclepias. Author believes that in *Asclepias cryptoceras* pollination may be effected by other long-tongued bees or butterflies as well as by bumblebees.—*P. D. Strausbaugh.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

911. Arnould, A. **L'impôt forestier en Angleterre. [Forest taxation in England.]** [Review of: Buccleuch, Duke of. **Taxation of woodlands.** Trans. Roy. Scot. Arb. Soc. 32: 169–173. 1918.] Rev. Eaux et Forêts 57: 2–3. 1919.—The increasing burden of taxation on forest property is not peculiar to France, but exists also in England. In two specific instances there taxes amounted to 122 per cent and 132 per cent of the total revenue. Forest products are the only kind of property subject to the so-called "death duty" of 21 per cent and also to income and supertaxes amounting to 52.5 per cent. Because of the heavy burden imposed by this double taxation reforestation is financially unprofitable.—The author expresses the hope that forest owners in England will be able to secure a fair and rational income tax on forests which can be adapted to French conditions.—*S. T. Dana.*

912. BARBEY, A. **Chronique Suisse.** **[Swiss notes.]** Rev. Eaux et Forêts 57: 21-24. 1919.—Increased demands for wood, largely for American barracks in France, have caused a considerable advance in wood prices during the past year. Transportation of forest products has been difficult. Price fixing for coniferous timber has been inaugurated by the Government, and special steps have had to be taken by the cantons to keep the pulp and paper factories in operation. The war has emphasized the need for careful management of Switzerland's forest resources under the direction of technically trained men, in order to wipe out the annual deficit of 700,000 cubic meters in the production of forest products which existed in 1913. The Canton of Vaud in 1918 furnished an example worthy of imitation elsewhere by increasing the number of local foresters from 11 to 20. This resulted in reducing the area, of from 7000 to 11,000 hectares, formerly assigned to each forester, to 4000 hectares.—*S. T. Dana.*

913. BOERKER, R. H. D. **Our national forests.** New York, 1918.—See Bot. Absts. 2, Entry 917.

914. BUCCLEUCH, DUKE OF. **Taxation of woodlands.** Trans. Roy. Scot. Arb. Soc. 32: 169-173. 1918.—See Bot. Absts. 2, Entry 911.

915. CHANCEREL, L. **Les meilleures essences de boisement dans la région du Centre.** **[The best species for forestation in the region of the Centre.]** Rev. Eaux et Forêts 57: 31-33. 1919.—Certain planting experiments undertaken in November, 1909, on poor, silicious soils, very dry in summer and wet in places in winter, indicate *Quercus palustris, Q. rubra, Q. phellos, Betula nigra, Alnus cordifolia, Populus balsamifera,* and *P. nigra* var. *angulata robusta,* as the best broadleaf trees for the region, to secure a quick growth and improvement of the soil. *Pinus maritima* var. *corte* (in mixture with *P. sylvestris*), *Pseudotsuga douglasii* (*taxifolia*), *Picea menziesii,* and *Cedrus deodara* are similarly regarded as the best coniferous species for the region. Elm, maple, basswood, ash, hornbeam, chestnut, hickory, and walnut proved unsuitable.—*S. T. Dana.*

916. DEMORLAINE, J. **L'importance stratégique des forêts et la guerre.** **[The strategic importance of forests in the war.]** Rev. Eaux et Forêts 57: 25-30. 1919.—In addition to their value as producers of wood for military purposes, forests have a tactical importance in war by furnishing local shelters for machine guns, observation outposts, etc., and, where they occur in continuous stands over a considerable area, a strategic importance by furnishing shelter for large bodies of troops. The German advance across the Vosges mountains in 1914 was stopped by the great forests of Alsace, the Vosges, and Lorraine. Paris was saved both in 1914 and 1918 by the forests of Villers-Cotterets and of Compiègne. In 1918 the German retreat was favored by the great forests of the Ardennes.—The French forests should be given a long period of rest, and the Germans forced to replace in kind the wood for the destruction and premature use of which they have been responsible. Intensive hunting in the devastated forests should be stopped, and the game should be allowed to keep the rodents in subjection, which have largely disappeared as a result of military occupation.—*S. T. Dana.*

917. GAGER, C. STUART. [Rev. of: BOERKER, RICHARD H. DOUAI. **Our national forests.** New York, 1918.] Torreya 19: 14-15. 1919.—The book is invaluable as a survey of the history and activities of the U. S. Forest Service, and of the need and value of its work. It is specially recommended as a reference book.—*J. C. Nelson.*

918. GUYOT, CH. **Jurisprudence.** **[Legal matters.]** Rev. Eaux et Forêts 57: 4-5. 1919. —There is nothing in the Code forestier, or in other laws of France, to prevent a private owner from appointing a woman as forest guard. When such an appointment is agreed to by the prefect or subprefect, the civil court must accept the oath of office of the woman so appointed provided no other legal barrier to the appointment exists.—*S. T. Dana.*

GENETICS

George H. Shull, *Editor*

919 Alderman, W. H. **Experimental work on self-sterility of the apple.** Proc. Amer. Soc. Hortic. Sci. 14: 94–101. 1918.—See Bot. Absts. 1, Entry 957.

920. Anonymous. **Plant breeders find new tobacco hybrid.** Jour. Heredity 9: 354–356. *Fig. 7–9.* Dec., 1918.—Montgomery Seedleaf tobacco (Hybrid No. 199) is result of cross between Washington (Ohio) Seedleaf and Big Graham. Parents have drooping leaves, hybrid erect. Latter is productive and seems to possess drouth resistance.—*R. J. Garber.*

921. Anonymous. **Environmental factors and heredity differences influencing fruiting of cotton.** Jour. Heredity 9: 372–374. Dec., 1918.—Quotations from Ewing, E. C., Technical Bull. 8, Mississippi Agric. Coll. *93 p.* June, 1918. Discusses importance of earliness as it involves resistance to boll weevil, and mentions several factors that go to make up earliness. —*Merle C. Coulter.*

922. Anonymous. **Heredity of tumors of the nerves.** Jour. Heredity 9: 380–381. Dec., 1918.—Preiser and Davenport (Amer. Jour. Med. Sci., Oct., 1918) published evidence interpreted to mean that multiple neurofibromatosis is Mendelian dominant. In this disease sessile or pedunculated swellings of variable size, containing nerve fibres, appear on body. Number varies and increases with age. Hashimoto (1890) made out 4503 on middle-aged Japanese man. Since only one case in 2000 coming to clinics for skin diseases is of this sort, affection is very rare. It occurs in father and child quite as frequently as in mother and child and is therefore not transmitted through placenta. In some cases it actually seems to skip a generation, but authors consider this may be due to occasional failure of a dominant trait to appear, as in polydactylism of fowl. Assertion is made that trait is dominant. There are 243 cases described of which 158 had one parent affected. In 34 cases neither parent was recorded as affected. The other 51 cases were left out of "families charted." There are then at least 65 per cent showing direct descent, but further evidence is needed to include this as an undoubted Mendelian dominant.—*P. W. Whiting.*

923. Anonymous. ["B."] [Rev. of: Ziegler, H. E. **Die Vererbungslehre in der Biologie und in der Soziologie, usw. [Genetics in biology and sociology, etc.]** (See Bot. Absts. 2, Entry 963.)] Anat. Anzeig. 51: 511–512. Dec. 30, 1918.—Ziegler's emphasis on theory of chromosomes and their reduction as solution of results of experimental genetics differentiates him from investigators like Johannsen who neglect it, or like Plate and Goldschmidt who only incidentally notice this theory. Section of book on problems of sociology and political science represents Ziegler's life work; his deductions in these fields are based on biological grounds. Reviewer thinks it hopeless at present for scientific facts to influence views of politicians or mass of people.—*J. P. Kelly.*

924. Anonymous. **"Diluting" colors of carnations.** Florists' Exch. 47: 285. Feb. 15, 1919.—Refers to attempt of New Jersey Experiment Station to secure scarlet carnation by crossing maroon variety, Princess Dagmar, with white variety called Matchless; seedlings that resulted were widely varying but no mention is made of scarlet among them.—*James P. Kelly.*

925. Babcock, E. B., and J. L. Collins. **Genetics laboratory manual.** 1st ed. *16 × 24 cm., xi + 56 p., 14 fig.* McGraw-Hill Book Co.: New York. 1918.—Intended to supplement combined lecture and recitation course consisting of one 3-hour period a week for 15 or 16 weeks. Exercises comprise four lines of study; (1) *Drosophila* breeding experiments; (2) Variation in plants; (3) Mendelism in plants, (4) Plant and animal breeding. Three alternative exercises are suggested under most of the numbers thus permitting course to be varied from year to year. Appendix contains Pearl's table for testing goodness of fit in Men-

delian ratios, instructions for rearing Drosophila for class use and research, list of laboratory materials needed for Drosophila experiments, and list of selected works for reference, and periodicals treating of variation, heredity, breeding and evolution.—*E. E. Barker.*

926. BOULENGER, G. A. **L'évolution est-elle réversible? Considérations au sujet de certains poissons. [Is evolution reversible? Considerations relating to certain fishes.]** Compt. Rend. Acad. Sci. Paris **168**: 41–44. 1919.—See Bot. Absts. 3, Entry 598.

927. BOULENGER, G. A. **Un cas d' évolution ontogénique á rebours chez un Lézard africain (Eremias lugubris A. Smith). [A case of reversed ontogenetic evolution in an African lizard (Eremias lugubris A. Smith).]** Compt. Rend. Acad. Sci. Paris **168**: 78–80. 1919.—See Bot. Absts. 3, Entry 599.

928. BURKHOLDER, W. H., I. M. HAWLEY, AND E. W. LINDSTROM. **Some results of the New York State bean investigation.** Proc. New York State Fruit Growers' Assoc. **16**: 120–125. 1918. [See Bot. Absts. 1, Entry 84.]

929. COCKERELL, T. D. A. **Hybrid perennial sun-flowers.** Bot. Gaz. **67**: 264–266. Mar., 1919.—Several supposed hybrids between various species of perennial sunflowers are noted and in one case, described in detail. Such hybrids could reproduce vegetatively and give rise in nature to a uniform group of plants of considerable extent with aspect of true species. *Helianthus orgyaloides*, nov. is presumably a hybrid between *H. orgyalis* DC. and *H. Maximiliani* Schrad. A form of this hybrid is known to the trade. Possibly, through hybridization in the genus *Helianthus*, new forms with attributes of species may be demonstrated.—*Orland E. White.*

930. COLLINS, J. L. **Chimeras in corn hybrids.** Jour. Heredity **10**: 2–10. *7 fig.* Jan., 1919.—Mosaic seeds of maize having part colored and part uncolored areas and other seeds having part starchy and part wrinkled areas in the endosperm of hybrid seeds in which the dominant characters came from male parent are considered to be due to mutation in somatic tissue. An F_2 partly colored seed, if it is found that the embryo is homozygous for the color, is expected to furnish proof, between the former idea of Correns and of Webber of independent development of female and male nuclei and the theory of mutation as the cause. Somatic segregation is not considered a possible interpretation. Occurrence of similar phenomena in fig, canna lily and gladiolus is mentioned and illustrated.—*D. F. Jones.*

931. COOK, O. F. **Evolution through normal diversity.** Jour. Washington Acad. Sci. **9**: 192–197. April 4, 1919.—Attention is directed to the observation of THOMAS MEEHAN (Contribution to the life-histories of plants. No. X. Proc. Acad. Philadelphia **1894** : 53. 1814.) "that there is an innate power to vary coexistent with the species itself, independent of any conditions of environment." Author points out that bearing of this conception upon evolutionary progress was obscured by Meehan's belief that contrasted characters would tend to disappear through swamping effect of intercrossing. Persistence of many divergent or contrasted characters in hybrid populations is recognized as refuting this hypothesis and idea that diversity is lost through crossing is now discarded. Instead of tending to impede evolution, intercrossing of lines of descent in species is held to present the condition most favorable for preservation and extension of new characters. With this fact recognized it follows that new characters may be preserved in natural species without individuals being segregated by selection or otherwise.—Author disapproves tendency of geneticists to regard species as consisting normally of uniform, identical individuals, because in nature endless individual diversity is found, which accords with conception of continued development and gradual diffusion of inherited characters among the members of a species. Conclusion is reached that "phenomena of variation and diversity are largely differences of expression, including accommodation, or varied expression of adaptive characters, to suit different conditions of existence."—Evolution is defined as process of continuous integration and differentiation of characters, the two essential conditions of which are normal diversity ("heterism") and free intercrossing of lines of descent ("symbasis").—*J. H. Kempton.*

932. Delage, Yves. **Suggestion sur la nature et la causes de l' hérédité ségrégative (caractères mendéliens) et de la hérédité agrégative (caractères non mendéliens). [Suggestion as to the nature and the causes of segregative heredity (Mendelian characters) and of aggregative heredity (non-Mendelian characters).]** Compt. Rend. Acad. Sci. Paris **168**: 30–36. 1919.

933. DeVries, Hugo. **Kreuzungen von Oenothera Lamarckiana mut. velutina. [Crosses of Oenothera Lamarckiana mut. velutina.]** Zeitschr. indukt. Abstamm. Vererb. **19**: 1–38. Mar., 1918.—*Oenothera Lamarckiana* mut. *velutina* (syn. *O. Lamarckiana* mut. *blandina*) is a slender, narrow-leaved mutant with a loose inflorescence and resembles *rubrinervis* more closely than its parent *Lamarckiana*. It is further distinguished by having a high percentage of fertile seeds and does not give the twin hybrids *laeta* and *velutina* but on the contrary uniform hybrids of the latter type when crossed with other species; this indicates that *laeta* gametes are not formed and that the plant is pure *velutina*. Crossed with *Lamarckiana* the first generation presents *laeta* and *velutina* hybrids but the former group consists of two types differing in respect to their heritable characters and named respectively *laeta letalis* and *laeta rediviva*. More than half of the seeds of *laeta letalis* are sterile and its offspring, when selfed, are uniform; it throws no *velutina*. In contrast, *laeta rediviva* has almost no sterile seeds and splits into *velutina* and *laeta* the latter presenting three types, (1) one with reddish leaves, (2) one with green leaves, and (3) a form intermediate, in the ratio of 1:1:2. The first two types when selfed are constant; the third form, making up about half of the assemblage splits into the same three types and in the same ratio.—The results of other crosses are reported and also a number of crosses involving several different species of Oenothera. There is discussion of lethal factors in *Oenothera Lamarckiana* and of mass mutation. —*B. M. Davis.*

934. Dollfus, Robert. **Continuité de la lignée des cellules germinales chez les Trématodes Digenea. [Continuity of the germ-cell line in the trematode Digenea.]** Compt. Rend. Acad. Sci. Paris **168**: 124–127. 1919.—Investigations of larvae of a number of species of Distomata and Monostomata gave following results: Sporocysts, rediae and cercariae arise from single germinal line of cells and not from somatic cells lying in walls of the sporocysts or rediae. Germ-cell line, which originates from blastomeres of fertilized egg, gives rise to sexual cells of adult and in course of life cycle of the trematodes, to somatic cells which form the tissues of these sporocytes, rediae, and cercariae. Thus somatic tissues of these larval forms take no part in origin of succeeding stage in life history of these organisms, and are "steriles" in this respect, but simply protect and transport germ-cell line. Author presents diagram showing continuity of germ cells from fertilized egg to fertilized egg of succeeding generation, with list of tissues on one side that disappear without producing descendants, and a list on other side that arise from germ-cell line up to formation of eggs by adult trematode.—*R. W. Hegner.*

935. Fruwirth, C. **Die Umzüchtung von Wintergetreide in Sommergetreide. [The breeding of winter cereals into summer cereals.]** Zeitschr. Pflanzenzücht. **6**: 1–46. Mar., 1918.—Early spring planting of winter cereals permitted practically normal maturation in many cases. Later planting produced few fertile stalks or none at all. Species, varieties and selected lines differ in degree of normal production when planted together at different times. Exposure of seed to high and low temperatures and to chloroform previous to planting had no differentiating effect. Exposure of plants to different temperatures throughout the winter and at different intervals made no pronounced difference. By taking two lots of seed from the same head, in many experiments with different sorts of wheat, and planting one lot in the spring and the other in the fall during several years and then planting the two lines at the same time no differences were observed. A difference found with rye by the same method was attributed to a presumable heterozygosity made possible by natural cross-pollination. Common cereals of Europe considered to be originally winter forms. Some have lost ability to live over winter. Some have become particularly adapted to spring

planting and may or may not retain winter hardiness. Several varieties grown for many years as spring grains were shown to be still capable of fall sowing. Dual types which can be grown successfully by either fall or spring sowing were found to exist in many varieties. Changing of a winter form into a summer form consists essentially in sorting out of these different types.—*D. F. Jones.*

936. Glaser, O. C. **Inheritance of absence of the sense of smell.** Jour. Heredity 9: 347. Dec., 1918.—Certain person lacks sense of smell entirely. Strong odors are simply "felt." Brother and mother are likewise defective. First cousin shows same defect, coming, however, from another family. Locus of origin, in Russia, is apparently inbreeding this deficiency. It is safe to say that character is hereditary, although exact method is uncertain. [See Bot. Absts. 2, Entry 957.]—*P. W. Whiting.*

937. Goodale, H. D., and Grace MacMullen. **The bearing of ratios on theories of the inheritance of winter egg production.** Jour. Exp. Zoöl. 28: 83–124. Apr. 5, 1919.—Authors present a theory alternative to Pearl's, applicable to inheritance of fecundity in the domestic fowl. It may be stated as follows:—Winter egg production falls into one of two classes—high (over 30) and mediocre (under 30); high fecundity depends upon simultaneous presence of two factors, *A* and *B*, while mediocre production depends upon presence of not more than one of these two factors in duplex, simplex or nulliplex condition; these two factors are inherited according to usual dihybrid scheme.—For this theory author mentions following advantages: (1) It is simpler because it does not involve sex-linkage, (2) it accounts genetically for birds in the over-30 class, for which Pearl's theory requires supplementary explanation, and (3) the only marked departures from expected ratios are downward, i.e., there is a deficiency of high producers.—On basis of data presented, author concludes that Pearl's theory, though not disproved, is not of universal applicability. Author believes, however, that mode of inheritance of winter egg production remains to be ascertained and that problem should be approached from a new angle, namely that of inheritance of the several factors whose combined action results in production of given number of eggs for winter period.—*P. B. Hadley.*

938. Halsted, Byron D. **Possible correlations concerning position of seeds in the pod.** Bot. Gaz. 67: 243–250. Mar., 1918.—Study of the relationship between number and position of seeds in pod of Lima bean and viability of seed and character of pods produced. The modal number of ovules and seeds is three. Concludes that seeds from central region of pods are most viable and produce larger number of pods than do those from base or tip. Seed maturation and seed weight increases from proximal to distal end of pods. Seeds borne in pods in which a portion of ovules are aborted are heavier than those in which all ovules mature.—*J. Arthur Harris.*

939. Harland, S. C. **A note on the inheritance of anthocyanin pigmentation in castor bean crosses.** Agric. News, Barbados 17: 403. Dec. 28, 1918.—Observations on crossing semi-wild type of castor bean with ornamental variety known as *Ricinus Gibsoni.* Latter had red capsules, stems and leaves; former had green capsules and pink stems. F_1 had green capsules but red stems; F_2 consisted of 102 green-capsuled and 31 red-capsuled plants. Author refers to some variation in recessive class indicating modifying factors. F_1 seed color was intermediate brown; no F_2 red capsules contained F_1 seed color and author suspects genetic correlation [linkage].—*James P. Kelly.*

940. Harland, S. C. **Notes on inheritance in the cowpea. Anthocyan colouration of stem and leafstalk, and New Era pattern of the seed coat.** Agric. News, Barbados 18: 4–5. Jan. 11, 1919.—Cowpea varieties with anthocyanin near leaf and leaflet junctions crossed with totally unpigmented kinds gave pigmented F_1 generation, and F_2 of parental types in ratio of 132 pigmented to 39 unpigmented. Of 15 F_2 pigmented plants tested, 4 were constant and 11 showed simple segregation again; single genetic difference is inferred. Inheritance of seed coat color determined in cross of cowpea varieties called New Era and Para; former has

seeds brown dotted with blue; latter has seeds pale cream unspotted. F_1 bore seeds like New Era with lighter spots; F_2 consisted of three seed types, New Era (including those like F_1), a new type that was brown and unspotted, and Para-type; ratio approximated 9:3:4. Two factors are assumed, R, producing brown pigment in seed coat, and E causing New Era pattern; E acts only in presence of R.—*James P. Kelly.*

941. Harland, S. C. **Notes on inheritance in the cowpea. The color of the seed coat pattern.** Agric. News, Barbados 18: 20. Jan. 25, 1919.—Data on some genetic relationships of black, brown, maroon, red and white coloration. F_2 from cross of brown and red gave ratio of 12 brown, 3 maroon: 1 red; brown parent interpreted as having factor N for brown and hypostatic factor M for maroon; red parent as lacking both. Red proved recessive [hypostatic] to all colors investigated and was crossed to pure white in Para variety; F_2 of 10 brown: 3 red: 4 white-seeded plants revealed latent N factor in Para; there is no maroon factor in Para; latter crossed with maroon variety gave brown-seeded F_1 of 12 plants,—no F_2 was grown. Para crossed with black gave F_2 ratio approximately 9 black: 3 brown: 4 white; both Para and black are assumed to have N, with black also carrying B (black) and R (red) factors which Para lacked; B is without effect in absence of R. Factor R is prerequisite for expression of B, N, and M.—*J. P. Kelly.*

942. Hartwell, B. L., and S. C. Damon. **Miscellaneous experiments with corn.** Rhode Island Agric. Exp. Sta. Bull. 173. *27 p.* 1918.—Three distinct strains of White Cap flint corn crossed among themselves gave no increase in yield of grain for F_1 generation. The first hybrid generation from two strains differing in stover production yielded an intermediate amount. In one experiment the seed grains of Rhode Island White Cap corn were separated into groups of high and low specific gravity; light one yielded at rate of 81.1 bushels per acre and heavy ones at rate of 87.4 bushels per acre. Seed grain produced under crowded and uncrowded conditions gave no significant differences in yield in next crop. In one trial varying amounts of nitrogen supplied to seed-producing plants led to no differences in yield of progeny grown on uniform soil.—*J. P. Kelly.*

943. Harwood, W. S. **New creations in plant life.** New York, 1918. Rev. by Orland E. White in: Torreya 19: 15–17. 1919.

944. Ibsen, Heman L. **Synthetic pink-eyed self white guinea-pigs.** Amer. Nat. 53: 120–130. *5 fig.* Mar.–Apr., 1919.—Pink-eyed self white guinea-pigs lacking albino factor (C_a) were produced by mating a pink-eyed (pp) non-yellow (C_rC_r) tortoise (e^pe^p) to a self red of composition, dark-eye (PP), full pigmentation (CC), non-extension (ee). F_1's ($PpCC_re^pe$) appeared ordinary tortoise. F_2 generation should give a pink (pp), non-yellow (C_rC_r), non-extended (ee) among 64 individuals. Since obtaining a large F_2 generation was necessarily slow, a $PpCC_re^pe$ male was mated to a PPC_dC_aee female. One of the offspring, appearing somewhat like albino since he carried brown (b) recessive to black (B), proved to be dark-eye carrying pink-eye (Pp), non-yellow carrying albinism (C_rC_a), non-extended (ee). When mated to a pink-eye (pp), dilute carrying non-yellow (C_dC_r), tortoise carrying non-extension (e^pe), he sired among twelve offspring one male and one female that were pink-eyed, non-extended, non-yellow, or the desired self white. When crossed with true albinos (C_aC_a), the female proved to be ppC_rC_aee and the male ppC_rC_ree. These two have produced 24 offspring, all white like themselves. In tests for recessive albinism, one of them, mated to a $PPEE$ albino, produced a dark-eyed *self-black*. These synthetic whites satisfy fanciers' standard better than general run of true albinos lacking pigment altogether. "Pink-eyed" (pp) albinos also have been produced and are up to standard. Another way of producing pink-eyed white would be to combine Castle's dark-eyed self white (extended white spotting) with pink-eye. These would be unstable in breeding tests. The production of pink-eyed white with all recessive factors except albinism would be of value in linkage experiments.—*P. W. Whiting.*

945. JELINEK, J. **Beitrag zur Technik der Weizenbastardierung. [Contribution to the technique of wheat crossing.]** Zeitschr. Pflanzenzücht. 6: 55–57. Mar., 1918.—An expedient method of crossing wheat whereby two sorts are planted close together, head of female plant castrated and enclosed with head of male plant in same stage of development by wrapping the two with paper and tying at both ends. In this way crossed seed and selfed seed of male parent are obtained with little effort and less danger from contamination by undesired pollen. The former practice of castrating and pollinating by hand is compared with this process. In five years tested, hand transfer of pollen gave from 6.6–32.4 per cent of heads with seed and from 1.4–3.9 as the average number of seeds per head. During two years jointly-enclosed heads gave from 46.1–51.0 as the per cent of heads with seed and 2.9–4.6 as the average number of seeds.—*D. F. Jones.*

946. KIHARA, H. **Ueber cytologische Studien bei einigen Getreidearten. Mitteilung I. [Cytological studies on several species of cereals. I.]** Bot. Mag. Tôkyô, 33 (No. 386): 17–38. *21 fig.* Feb., 1919.—The F_1 hybrids between two different species of wheat possessing 14 and 21 chromosomes respectively (diploid!), as, e.g., *Triticum durum* and *T. vulgare,* have $14+21=35$ chromosomes, the species having greater number of chromosomes being used as pollen-plant in these hybridizations. In the heterotypic division of pollen-mother-cells of these hybrids 14 chromosomes derived from father and other 14 derived from mother form 14 bivalent chromosomes as usual, while the remaining 7 derived from father remain univalent, thus making 21 chromosomes in all. Fourteen bivalent chromosomes undergo longitudinal cleavage as usual and wander to two poles to form two daughter nuclei, while 7 univalent ones remain generally for long time in nuclear plate, though they are finally absorbed by normal chromosomes or form extranuclear nucleoli. In F_2 and F_4 individuals 35 or 38 chromosomes were found. Reduction division of embryo-sac-mother-cell seems to take place in same way as that of pollen-mother-cell. In plant produced by back-cross of wheat-rye hybrid by wheat root-cells were examined: some individuals were found to possess 42 chromosomes, while others derived from same parent have only their 38. Author thinks that in wheat-rye hybrid the number of chromosomes increases in successive generations, maximum number being 42.—*S. Ikeno.*

947. KNIGHT, L. J. **Physiological aspects of self-sterility of the apple.** Proc. Amer. Soc. Hortic. Sci. 14: 101–105. 1918.—See Bot. Absts. 1, Entry 964.

948. LITTLE, C. C. **A note on the fate of individuals homozygous for certain color factors in mice.** Amer. Nat. 53: 185–187. Mar.-Apr., 1919.—Writer reports results of determining relative numbers of normal and abnormal fetuses formed when yellow mice are mated *inter se* and when they are mated to mice of another color. In former case, there were 91 normal and 21 abnormal fetuses, in the latter 42 normal and only one abnormal. This is held to support view, already maintained by several students of mice, that the homozygous yellow individuals perish *in utero,* thus accounting for the long-known abnormal ratio of two (dominant) yellows to one non-yellow, in F_2 hybrids of these animals, and the fact that the pure dominant type is not known to occur. Little likewise offers some limited evidence that a similar prenatal mortality occurs among the homozygous embryos of "black-eyed-white" mice.—*F. B. Sumner.*

949. LLOYD, FRANCIS E. **The origination of ascidia under quasi-experimental conditions.** Trans. Roy. Soc. Canada 1^8: 71–80. 1918.—Describes ascidia formed in cotton plants grown in small pots and subjected to alternate periods of drought and moisture. Attributes results to mechanical pressure set up in the growing buds by resistance offered to rapidly growing internal parts by indurated outer regions. Characters of incompletely ascidiate leaves consist in foldings, sinuses, concrescences, enations. These malformations are not identical with tomosis but may appear concurrently. There is no evidence for inheritance in the cotton plant except that offered by "cluster" varieties in which concrescences, fasciations and concomitant behaviors are dominant.—*J. Arthur Harris.*

950. LUMSDEN, D. **Orchid breeding.** Jour. Internat. Gard. Club 2: 203–212. *5 fig.* 1918.—Brief review and discussion of history of orchid breeding and of troubles involved in raising seedlings. Several hybrids upwards of 50 years old, propagated asexually, still retain their original vigor. Author is studying Mendelian inheritance and effect of close-pollination in this family. It is author's firm belief deduced from his own and experiments of others, that various root fungi are necessary to successful growth of orchids, especially seedlings. Probably case of mutual parasitism and not symbiosis. Separate organism is required for each tribe, and often for each genus and even species. Attempts are being made to obtain pure cultures of these orchid fungi. Methods and culture medium are described in detail.—*Orland E. White.*

951. MCCLELLAND, T. B. **Influence of foreign pollen on the development of vanilla fruits.** Jour. Agric. Res. 16: 245–251. *Pl. 31–35.* 1919.

952. PEARL, RAYMOND. **On the mean age at death of centenarians.** Proc. Nation. Acad. Sci. [U. S. A.] 5: 83–86. *1 fig.* Mar., 1919.—Purpose of this paper is to determine with accuracy where deaths at one hundred years or over should be centered in statistical computations. Interval evidence of inaccuracies found in the census data available. By use of a properly graduated mortality table, author arrives at figures 101.7 for whites and 102.0 for negroes.—*Sewall Wright.*

953. PRICE, J. D. **Report of Director.** Ann. Rept. Georgia Agric. Exp. Sta. 30–31. (1917–1918): 4–18. 1919.—Includes brief statement of breeding results in collards (*Brassica*), tomatoes (*Lycopersicum*) and grapes (*Vitis*).—*G. H. Shull.*

954. ROBERTSON, T. BRAILSFORD, AND L. A. RAY. **Experimental studies on growth. X. The late growth and senescence of the normal white mouse and the progressive alteration of the normal growth curve due to inbreeding.** Jour. Biol. Chem. 37: 377–426. *8 fig.* Mar., 1919.—Paper describes normal growth curve of white mice between 4 weeks of age and death from natural causes. The maximum weight was reached at 91 weeks in males, 94 weeks in females. Average duration of life was 110 weeks in males, 103 weeks in females. Close inbreeding was carefully avoided, but progressive decline in rapidity of growth, noted between 1914 and 1917, is attributed to continued breeding within one stock.—*Sewall Wright.*

955. SALISBURY, E. J. **Variation in Eranthis hyemalis, Ficaria verna, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth.** Ann. Bot. 33: 47–79. *20 fig.* Jan., 1919. [See Bot. Absts. 2, Entries 703, 749.]

956. SÔ, M., Y. IMAI, and Y. TERASAWA. **Daikon no hi-Mendel-sei Iden ni tuite. [On the non-Mendelian inheritance of Raphanus sativa.]** [In Japanese.] Bot. Mag. Tôkyô 33 (No. 386, Japanese part): 21–30. Feb., 1919.—Results of culture-experiments on two red-rooted Chinese varieties of *Raphanus sativus*. Each of these varieties segregates by self-fertilization into red- and white-rooted plants, the number of latter being nearly equal to, or greater than, that of red. Extracted white plants breed true in later generations, while extracted red plants again segregate into red and white. Red plants crossed with white ones gives both kinds of plants, the number of white being almost equal to, or greater than that of red. Fertilization between two extracted white plants gives only white. Self-fertilization of flowers borne on green branches which are produced on red plant by vegetative segregation gives rise to white exclusively, while that of flowers borne on red branches of the same individual produces both kinds of progeny. When plants differing in intensities of red coloration were selfed or crossed with white ones the number of red plants segregated was, contrary to author's expectation, much greater in the case of less than in that of more intensely colored plants. Authors conclude that the inheritance here mentioned is non-Mendelian, but do not enter into theoretical discussion.—*S. Ikeno.*

957. STOCKARD, CHARLES B. **Hereditary deficiencies in the sense of smell.** Science 49: 237–239. Mar. 7, 1919.—Author criticises hypothesis of GLASER [Bot. Absts. 2, Entry

936] that "smell-blindness" (a term used by Blakeslee, unfortunate because anosmia is comparable with *actual* blindness rather than with color-blindness) occurring in "a young Russian Jew, a fugitive from Kiev" is hereditary. Disease, rhinoscleroma, endemic in region of Kiev, and various forms of chronic rhinitis, prevalent among Russian Jews, produce anosmia. Careful studies of environmental conditions are necessary in testing heredity of deficiencies of this sort. It is very probable, however, that defects in sense of smell are in some cases hereditary.—*P. W. Whiting.*

958. STOMPS, THEO. J. **Vergrünung als parallele Mutation. [Virescence as a parallel mutation.]** Rec. Trav. Bot. Neerlándais 15 (1918): 17–26. *1 table, 1 fig.* 1919.—In preceding paper author has mentioned occurrence of same mutation in different species of *Oenothera* and has called this phenomenon "parallel mutation." A new case of parallel mutation is here described. Several years ago de Vries observed a mutant of *Oenothera Lamarckiana*, which showed virescence and same mutation was found by author in 1917 in cultures of *Oenothera biennis*. The mutant plant was quite sterile and had groups of little leaf-bearing branches instead of flowers. Apex of smallest leaves of these branches was often curled up and this is considered by author as indication that they were destined to become stamens. Some leaves were divided and branches often showed fasciation. Number of chromosomes of mutant plant proved to be 14, like that in original *Oenothera biennis* and author was unable to observe disappearance of parts of chromosomes, as Delaunay had observed in sterile forms of *Muscari*. Occurrence of forked leaves and fasciated branches leads author, in opposition to de Vries and Worsdell, to consider fission of leaves not as incipient form of fasciation but as first step towards reappearance of dichotomous branching of lower plants.—*Tine Tammes.*

959. STRAMPELLI, N. **Genealogia del frumento Carlotta Strampelli. [Genealogy of the grain Carlotta Strampelli.]** Atti R. Accad. Lincei, Rend. V, Cl. Sci. Fis., Mat. e Nat. 27^2: 131–135. *Fig. 1–4.* 1918.

960. VAN HERWERDEN, M. A. **Untersuchungen über die parthenogenetische und geschlechtliche Fortpflanzung von Daphnia pulex. [Researches on parthenogenetic and sexual reproduction of Daphnia pulex.]** Versl. Koninkl. Akad. Wet. Amsterdam, 20^2: 1. 1918.—The descendants of a parthenogenetic specimen of *Daphnia pulex* cultivated and pedigreed in the laboratory, from January, 1910 until December, 1917. Cultures were kept at room, cave, and brood-stove temperature (the water temperature of latter cultures varying between 12° and 18°C.—This cultivated stem of *Daphnia pulex* maintained, notwithstanding the altered condition of life, during these 8 years, the monocyclic characters it showed in nature. Controls have been taken during a year from the ditch where the Daphnias originated. While in the natural habitat only ephippial eggs survived during the winter months, in laboratory a part of the animals continued parthenogenetic method of reproduction. In this way a set of parthenogenetic generations without introduction of an ephippial egg has been cultivated from January 1910 till February 1916. It has been demonstrated that every autumn many room, cave, and brood-stove cultures commenced in the same time the sexual method of reproduction and it is notable that this simultaneous beginning of the sexual wave took place in *Daphnia* with quite diverging position in the pedigree, e.g., October 29, 1916 in two cultures diverging from the general stock since the winter 1912. This gametogenesis appeared as well in the first as in the later broods, as well in isolated individuals as in mass cultures. In many ways it has been tried to influence gametogenesis artificially, as in Woltereck's cultures of *Daphnia*. A sudden cooling of eggs in their last ripening period often gave rise to males, but only in a period of lability of the sexual and asexual tendencies. Also a preinduction has been observed, namely asexual differentiations of grandchildren after exposing ripening eggs of the grandmother during 24 hours. A radiation with radium or ultraviolet rays in sensible period of ovary has no influence on method of reproduction. Food changes did not affect sex in any way, nor did treatment with many different chemicals. Has one to conclude that continuations of this rhythmic mode of reproduction—continued notwith-

standing changed conditions of life in the laboratory—has been fixed in the genotype? Or must one accept autumnal influences working as well in the laboratory as in nature, but escaping observation?—The cultivated stems of *Daphnia pulex* showed no degenerations in the 8 years' culture. Temporary depressions have been restored by additions of traces of cyanhalin, manganochlorid and other substances. With yeast feeding also good results have been obtained. Variability as to the outer appearance proved to be very great in the cultivated stems of *Daphnia pulex;* but the only definite morphological change observed during these 8 years was the vanishing of the dorsal chitinous teeth which characterized during the first year of culture the greater part of the new-born *Daphnia.*—In a separate set of experiments with constant temperature it has been demonstrated that between 10° and 20°C. the embryonic development of *D. pulex* follows in broad lines the law of van't Hoff about temperature coefficients.—*M. A. van Herwerden.*

961. van Herwerden, M. A. **Effects of the rays of radium on the oögenesis of Daphnia pulex.** Versl. Koninkl. Akad. Wetensch. Amsterdam 21^4: 1919.—Egg-cells of *Daphnia pulex* are most susceptible to radium radiations in the last stage of maturation. The resisting power increases during embryonic development. In one and same brood individual difference of susceptibility to rays of radium is frequently noted. The egg that resists deleterious influence often develops into perfectly normal animal, which becomes fertile. Rare specimens with morphological anomalies seldom become adults. Only once from such an abnormal young a stock without morphological changes has been raised.—Long-continued radiations from 0.7 milligram radium bromide does not endanger life of sexually mature *Daphnia,* but only its fertility. It depends on the duration and strength of radiations whether only maturing eggs, oöcytes, or also oögonia, are injured. Large progenies being easy of observation afford an opportunity to study this in every special case. Prior to maturation *Daphnia* resists radium radiations for long time. Only after a sojourn of many hours in the capsule with 0.7 milligram of radium bromide the future ripening of the oögonia is also endangered.—Microscopic examination of the ovary and embryos reveals that deleterious effect of radium manifests itself only toward close of blastula stage by abnormal behavior of the chromatin, as when the egg cells were affected when lying still in the ovary.—If the beta-rays are eliminated through filtrations, deleterious effect of radium is arrested or highly diminished, which proves beta-rays to be mainly responsible for destruction of the eggs.—*M. A. van Herwerden.*

962. White, Orland E. [Review of: Harwood, W. S. **New creations in plant life.** New York, 1918.] Torreya 19: 15–17. 1919.

963. Ziegler, H. E. **Die Vererbungslehre in der Biologie und in der Soziologie, ein Lehrbuch der naturwissenschaftlichen Vererbungslehre und ihrer Anwendungen auf den Gebieten der Medizin, der Genealogie und der Politik, zugleich 2 Aufl. der Schrift über die Vererbungslehre in der Biologie. Zehnter (Schluss) Teil des Sammelwerkes "Natur und Staat." [Genetics in biology and sociology, a text-book of genetics and its applications in the fields of medicine, genealogy and political science, being the 2nd edition of the work on "Genetics in biology" and tenth (concluding) part of the general work "Nature and the State".]** *xvi+479 p., 8 partly colored pl., 114 fig.* Gustav Fischer, Jena, 1918.—Author first considers chromosomes and their reduction, which he holds completely explain results of experimental genetics. Theory of human heredity must be based on general biological theory of heredity. Discusses significance of doctrine of hereditary factors for disease and malformations. Section dealing with problems of sociology and political science is new and author incorporates here pertinent conclusions from biological facts; he treats heredity of psychical traits including defects and mental disorders, natural dissimilarities of men; social inequality (social contracts, private property, natural gifts and social position, origin of social rank, the inferior, criminal); origin of family and state (zoological view, false doctrine of Rousseau, etc.); parliamentary government. [See also Bot. Absts. 2, Entry 923.]—*J. P. Kelly.*

HORTICULTURE

J. H. GOURLEY, *Editor*

964. BURKHOLDER, C. L. **Horticultural extension work in Indiana.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 56–59. 1919.—An outline is given of the methods pursued in carrying on horticultural extension work in Indiana. The work consisted principally in demonstration work in orchards, orchard club work, winter short course schools, landscape work, vegetable gardening, and exhibit work.—*J. H. Gourley.*

965. CLOSE, C. P. **Extension service in pomology in the United States Department of Agriculture.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 49–52. 1919.—An outline is given of the extension work which is being carried on by the U. S. Department of Agriculture. These activities consist in extension schools and field demonstrations, which cover practically every line of pomological work.—*J. H. Gourley.*

966. DARROW, GEORGE M. **Strawberry culture: South Atlantic and Gulf Coast Regions.** U. S. Dept. Agric. Farmers Bull. 1026. P. 1–40. *Illust.*—A discussion is given of the culture of the strawberry in the South Atlantic and Gulf Coast regions. Methods are recommended for the production and marketing of the fruit.—*J. H. Gourley.*

967. DARROW, GEORGE M. **Strawberry culture: Western United States.** U. S. Dept. Agric. Farmers Bull. 1027. P. 1–29. *Illust.*—A popular discussion is given on the standard methods of strawberry culture in the western United States.—*J. H. Gourley.*

968. DORSEY, M. J. **Hardiness in top-worked varieties of the apple.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 38–45. *1 fig.* 1919.—A discussion is given of the nature of frost injury and winter injury of various fruits. The degree of browning of the wood is considered a most sensitive index of the winter injury which occurs to fruit trees. On this basis cuts were made into the limbs, three to five annular rings deep, and a classification of hardiness was made under the headings, no injury, slight brown, brown and dark brown. Such hardy varieties as Oldenburg, Wealthy and Patten Greening were slightly injured in the winter of 1916–17 and even Hibernal, which is generally recommended as a stock was slightly injured. The Tompkins King, Hubbardston, Jonathon and Delicious, judging from this test, did not prove to be sufficiently hardy for Minnesota conditions. It is noted that relatively hardy stocks did not prevent the more tender varieties from being injured. In no case was the degree of injury of a given variety widely different on two or more different stocks.—The same observations were made for the succeeding winter, 1917–18 when the injury to apple trees in Minnesota was more extensive than for several years. It was concluded that many of the standard varieties of apples of the Eastern States approach the limit of their range in Minnesota.—The injury to the apple is generally more severe than is indicated by the amount of killing back of the twigs; the smaller branches and limbs show less browning of the wood than does the trunk; the hardiness of the cion is independent of that of the stock; and, if the stock exerts any influence on the cion it is so slight that no protection is afforded the more tender variety, are the conclusions of the article.—*J. H. Gourley.*

969. GUNDERSON, A. J. **The pruning of winter-injured peach trees.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 32–38. 1919.—Serious injury occurred to peach trees in southern Illinois. The appearance of the trees and conditions under which they suffered most are described. The Hale was injured more than the Elberta when growing under similar conditions.—Some experiments showed that light to moderate pruning was the most advantageous in the recovery of the tree of any practice followed in the text. Dehorning usually resulted in the death of the tree. Waxing the cut surfaces proved of no value. One pound of nitrate of soda per tree aided in recovery.—*J. H. Gourley.*

970. MACOUN, W. T. **Winter injury in Canada.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 13–17. 1919.—There have been seven winters in the past sixty years in which serious winter

injury has occurred in the Provinces of Ontario and Quebec, viz. 1858–59, 1876–77, 1884–85, 1895–96, 1898–99, 1903–04, and 1917–18. The most severe winters in the past twenty years were those of 1903–04 and 1917–18, and in neither winter was there any root-injury noted as the ground was well protected by snow. These two winters were quite similar in degree of cold, time of greatest severity of cold and in the ground protection of snow. The season of 1917 was a short growing season which was not true, however, of 1903.—In 1903–04 there were 306 apple trees including 164 varieties killed in the orchards of the Experimental Farm, Ottawa, while in 1917–18 there were 360 trees killed, including 200 varieties. In determining the exact time of the winter (1917–18) when the injury occurred data are offered which show that of 885 grafts made from cions cut December 5 and 6, 1917 on seedlings of Orion Crab, 559 or 63.16 per cent grew, while from 607 grafts made from cions cut February 13, 1918, 112 or 18.45 per cent grew, thus indicating the period when the wood was injured. This is in contrast with 1916–17 when 86.03 per cent of the grafts grew. Also by observing how low down on the trunks the injury occurred it appeared that the freezing took place early in the winter before a large amount of snow fell.—Injury to nursery stock was also very great. Notes were made on 300 varieties as to the degree of injury which occurred and they showed that of 11 per cent of the varieties which did not kill back at all 60 per cent were crab apple hybrids. The observation is also made that trees of the hardier varieties which were killed had borne a good crop in 1917. Data are given to establish this observation with the Wealthy. —While nearly all the domestica plums were killed or badly injured, few of the American sorts were hurt and they had a good crop in 1918. Russian pears and Morello cherries were killed or injured.—*J. H. Gourley.*

971. Marshall, Roy E. **Establishing the orchard.** Virginia Polytech. Inst. Ext. Bull. 41. *19 p., illust.*—Popular.

972. Oskamp, Joseph. **Winter injury in Indiana.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 25–30. 1919.—The winter of 1917–18 was the first on record that apple trees in Indiana suffered generally from low temperatures. Young trees, ranging in age from 3 to 14 years suffered most with a loss for the state of about 3 per cent, while old orchards suffered less.—Orchards in low spots suffered most, and there was a striking variation in hardiness of varieties. Baldwin, Stayman Winesap, Ben Davis, Northern Spy, York Imperial and Jonathon suffered most in about the order named. Northwestern Greening and Delicious were entirely uninjured. The nature of the previous season was cold and wet and such as to result in improper maturity of the wood, and this together with the earliness of the cold weather contributed to the cause of the severe injury. Trees which were weakened from any cause suffered most from winter injury.—Peach trees were severely injured, especially the older trees. The acreage of bearing trees has been reduced about sixty per cent from this cause. Experiments were conducted in orchards which suffered from winter injury to determine the best methods of aiding their recovery. The treatments involved checks, light, moderate and heavy pruning, and dehorning, as well as fertilizer tests. The outstanding results of the pruning work were the disastrous results of heavy cutting, and dehorning when the trees were dormant but when done in full leaf the results were successful. Late moderate pruning seems to be the most desirable method of treating the injured trees.—By applying two pounds of nitrate of soda to a 6-year-old tree the growth was greater and the foliage was maintained on the trees for a longer time than on the check trees.—*J. H. Gourley.*

973. Rees, R. W. **Extension work in pomology in New York.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 53–56. 1919.—The three main lines of work which received the attention of the extension specialist in horticulture in New York for the past year were pruning demonstrations, demonstration schools and conferences in regard to central packing houses.—*J. H. Gourley.*

974. Sutton, F. J., and H. R. Niswouger. **The home vegetable garden.** Kentucky Agric. Coll. Ext. Circ. 67. *43 p. Illust.*—A discussion is given of the development of the

home garden, dealing particularly with preparation and fertilization of soils, selection of varieties and planting distances of the crops, insect and fungous diseases affecting the crops with control measures, together with methods of practical home storage.—*J. H. Gourley.*

975. Woolsey, C. **Strawberry culture.** Virginia Polytech. Inst. Ext. Bull. 36. *16 p. Illust.*—Popular.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

976. Bugnon, P. **Sur une nouvelle méthode de coloration élective des membranes végétales lignifiées. [A new method for selective staining of lignified tissues.]** Compt. Rend. Acad. Sci., Paris, **168**: 62–64. 1919.—Author advocates the use of "Lichtgrün" as a differential stain for lignified tissues. Excellent results were obtained through the use of saturated solutions, both aqueous and alcoholic, acidulated by means of HCl or acetic acid. Simple washing with water removes the stain from all but lignified tissues and by combining "Lichtgrün" and Sudan III (alcoholic) a double stain differentiating suberized and cutinized tissues from lignified tissues is obtained. Promising triple combinations were made using "Lichtgrün," ammoniacal Gentian Violet, Sudan III, etc. The use of "Lichtgrün" instead of phloroglucine allows the use of hypochlorite of soda for the removal of the cell contents.—*V. H. Young.*

977. Groom, Percy. **The wood of Tetracentron Trochodendron, Drimys and other types.** Ann. Bot. **33**: 133. 1919.—A note explaining that Messrs. Bailey and Thompson had erroneously attributed to the author an expression of the view that these types are descended from a form which possessed wood vessels.—*W. P. Thompson.*

978. Hayden, Ada. **The ecologic foliar anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. **6**: 69–85. *Pl. 9–14.* 1919.—A brief statement is presented of the views of previous workers as to the importance and effect of environmental conditions on the structure of the leaf. The leaves of 28 species, characteristic of various habitats, are then described as to orientation, arrangement, gross structure and histology; and their features are compared. The presence in the leaves of these prairie plants of a specialized palisade tissue, a thick-walled and trichomeless epidermis, water-storing tissues, and sometimes of trichomes, indicates their xerophytic tendency. The writer points out that it is not the presence of any of these characters alone, but rather their correlation with other features of the plant, which is of primary importance as an indication of xerophytism.—*E. W. Sinnott.*

979. MacCaughey, Vaughan. **The Pala or Mule's-Foot Fern (Marattia Douglasii (Presl) Baker) in the Hawaiian Archipelago.** Torreya **19**: 1–8. 1919.—This fern is the sole representative in the Hawaiian Islands of the Marattiales. This order, abundant in early geologic periods, is at present represented by 6 genera and some 50 species, distributed through the tropics of both hemispheres, Hawaii forming the northernmost limit of its range. The occurrence of *Marattia Douglasii* in the Hawaiian Islands may be explained in three ways: (1) Introduced by natural means from the South Pacific; (2) Deliberately introduced by the natives as a food-plant; (3) Persisting as a survival of an earlier flora. This species is called *pala* by the Hawaiians, and is found somewhat sparingly through the humid zone of both windward and leeward slopes, between 800 and 3500 feet. The gross structure is described in detail. Campbell's study of the gametophytes is summarized. The fern does not occur in cultivation, but deserves attention. The name "mule's-foot fern" is proposed, in allusion to the enlarged leaf-base with the two thick fleshy stipules. These stipules were formerly baked and used as food, and were also used medicinally, and to make an agreeable drink. —*J. C. Nelson.*

980. PAVILLARD, J. **Sur la fleur femelle des Ruscus. [Concerning the pistillate blossom of Ruscus.]** Compt. Rend. Acad. Sci. Paris 168: 113–115. *Fig. 1–4.* 1919.—A brief review of the literature dealing with the morphology of the ovule of *Ruscus* is followed by a short discussion of original observations on the pistillate flowers of *Ruscus aculeatus* and *Ruscus hypophyllum* var. *hypoglossum.* Ovules are shown to be anatropous, with the same general organization as is found in the lily (*Lilium*). The inner integument protrudes beyond the outer integument at the mycropylar end, forming the opening of the mycropyle.—In *R. aculeatus* the ovule is completely surrounded by a layer of lignified cells with scalariform thickenings, similar to that described by Treub in 1891 for *Casuarina.*—*V. H. Young.*

981. WILLIAMS, KATHERINE A. **A botanical study of skunk-cabbage, Symplocarpus foetidus.** Torreya 19: 21–29. *Pl. 1–2, fig. 1–13.* 1919.—The range and dates of flowering of this species are described. The odor, which suggests fresh cabbage with a touch of mustard, varies widely, and is stronger in plants with ripe stamens. The early growth of the plant is described in detail. Attention is called to the double spathe in some plants. The color of the spathe varies from deep purplish-red to pale yellowish-green, usually mottled with purple. This variation in color does not seem to be due to age, as Reed has suggested, for out of 50 plants examined, withering and decay were not limited to the darker ones; nor does it seem to depend on water-content of the soil, as both colors occur side by side. The variation of flower-clusters in size and in number of flowers is shown by a table. Due to crowding, the parts of the flower are most often in fours instead of threes, and the flowers are almost cuboidal in shape. The stigma is three-lobed but the ovary is one-celled. Some specimens showed flowers with six stamens and six perianth-segments, others with the parts in fives, others with four stamens and six perianth-segments. The color and odor attract flies, which are useful in pollination. The process of germination is fully described. The plant probably does not produce flowers till the fourth year. The plants develop more rapidly in warm light places. The leaves show a transition toward netted-veining, especially under dry conditions. Microscopically they show rhaphides and other crystals. The juice is very bitter and acrid, but loses this property in boiling. The root-system is very large, the central rootstock being almost the size of a potato.—*J. C. Nelson.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

982. DENIS, MARCEL. **Sur quelques thalles d'Aneura depourvus de chlorophylle. [Concerning certain thalli of Aneura devoid of chlorophyll.]** Compt. rend. Acad. Sci. Paris 168: 64–66. *Fig. 1–2.* 1919.—The recent discovery of a species of *Aneura* devoid of chlorophyll, in the Département of Saône-et-Loire, France, is recorded. The thalli are fleshy and generally sterile, resembling the coralloid roots of certain saprophytes. The presence of an endophytic fungus consisting of "balls" of rarely branched hyphae in the lower parts of the thallus and in the thizoids was demonstrated by means of differential stains. *Aneura pinguis,* which contains chlorophyll, also harbors an endophytic fungus but never to the extent noted in the chlorotic *Aneura.* The fungus appears to replace chlorophyll both morphologically and physiologically, reducing the thallus to a purely saprophytic condition. The two forms of *Aneura* are compared to the gametophytes of *Lycopodium. L. inundatum* and *L. cernuum* contain chlorophyll and may be compared with *Aneura pinguis,* while the chlorotic *Aneura* may be compared with the gametophyte of *L. Selago* or *L. Phlegmaria.* The numerous questions raised by the association of the chlorotic *Aneura* and the endophyte are not answered.—*V. H. Young.*

983. DIXON, H. N. **"Chatubinskia" a further correction.** Bryologist 21: 80–81. 1918.—It is shown that this name should properly be "*Chalubinskia,*" since it was given in honor of Professor Chalubinskia, of Warsaw.—*A. W. Evans.*

984. HAYNES, CAROLINE C. **Sullivant Moss Society exchange list of Hepaticae found in the United States, Canada, and Arctic America.** Bryologist 21: 87–90. 1918.—A check list

of 438 species belonging to 96 genera. The sequence of the genera is according to the Engler and Prantl system.—*A. W. Evans.*

985. LORENZ, ANNIE. **Notes on Radula obconica Sull.** Bryologist 21: 56–59. *Pl. 25.* 1918.—The history of this endemic American species is reviewed, a full description is given, and a list of specimens (ranging from Vermont to North Carolina and westward to Arkansas) is added. Attention is called to the vegetative reproduction by means of caducous leaves, previously reported in a single Brazilian species of *Radula*. The figures illustrate clearly the general habit of the plant and its essential structural details.—*A. W. Evans.*

986. PEARSON, WILLIAM HENRY. **The genus Herberta as represented in the Manchester Museum.** Jour. Bot. 57: 42–44. 1919.—Localities are given for the twenty species represented in the Museum; also critical notes on *H. adunca* (Dicks.) S. F. Gray, *H. Hutchinsiae* (Gottsche) Evans (recently separated by A. W. Evans), and a few other species.—*K. M. Wiegand.*

987. PENNELL, FRANCIS W. **Concerning duplicate types.** Torreya 19: 13–14. 1919.

988. RILSTONE, F. **Cornish mosses and hepatics.** Jour. Bot. 57: 3–10. 1919.—Records are given from the eastern half of Vice-County 1 (West Cornwall) and from the drainage area of the Fowey and Looe Rivers in Vice-County 2 (East Cornwall). These include definite stations for most of the mosses and hepatics listed, the mosses representing 47 genera and the hepatics, 32. There are also brief notes on habitat, frequency, morphology and taxonomy. The whole is prefaced by a few paragraphs on the soil of the region, and the abundance of the bryophytic flora.—*K. M. Wiegand.*

989. WARNSTORF, C. **Übersicht der europäischen gelapptblättrigen Arten der Gattung Jungermannia L. p. p. oder Lophozia Dum. [Synopsis of the European species with lobed leaves of the genus Jungermannia L. in part or Lophozia Dum.]** Hedwigia 60: 53–84. March 15, July 10, 1918.—The author objects strongly to discarding the old generic name *Jungermannia* and advocates that it be retained for the species with lobed leaves, which many writers now refer to Dumortier's genus *Lophozia*. He discusses the European species by means of an extensive key, arranging them in the three groups *Bilobatae*, *Diversilobatae* and *Trilobatae*. Critical remarks, mostly in the form of footnotes, are added, and a new species, *J. kerguelensis* Warnst., from the island of Kerguelen is incidentally proposed. The European species recognized are for the most part those included in Müller's Lebermoose, but a few forms, such as *J. cylindracea* Dum. and *J. porphyroleuca* Nees, are given specific rather than varietal rank, and a few changes in specific names are advocated.—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. OLIVE, *Editor*

990. ATKINSON, GEO F. **Relationships within the Rhodosporeae.** Bot. Gaz. 67: 266–267. 1919.—Two distinct phyletic lines are recognized among the rosy-spored Agarics, distinguished in part by the presence of numerous internal cystidia in the lamellae of group one (*Pluteus* and *Volvaria*), and by their absence in group two (*Entoloma*, *Leptonia*, *Clitopilus*, *Eccilia*, *Nolanea*, and *Claudopus*).—*E. W. Olive.*

991. BURNHAM, STEWART H. **Charles Horton Peck.** Mycologia 11: 33–39. *Fig. 1.* 1919.

992. COLLEY, REGINALD H. **Parasitism, morphology and cytology of Cronartium ribicola.** Jour. Agric. Res. 15: 619–659. *Pl. 48–59.* 1918.—The paper deals particularly with the minute histology of the organism in all stages of its life history, and with the cytological phenomena exhibited in spore production in the various types of sori. The development and morphology of the pycnium, aecium, uredinium and telium are outlined in considerable detail, the ontogeny of peridia and spore chains being carefully followed. The relation of the

fungus to its hosts is discussed, and special attention is directed to the haustoria. These structures are abundant, and the most important elements of the mycelium from the diagnostic standpoint. Each haustorium is enclosed in a definite sheath which is thicker at the tip and base than at its sides. A theoretical explanation of this condition is advanced.—The nuclear history of the species is traced throughout all stages, and agrees in the main with that described for other rust fungi. Multicellular fusions at the base of the aecium are, however, of common occurrence. Since the number of polynucleate aeciospores is relatively small it is concluded that either the supernumerary nuclei in the basal cell degenerate or the basal cell gives rise to more than one chain of binucleate spores. Nuclear division is shown to be a true mitosis, and the haploid number of chromosomes is regarded as probably eight. The first division in the promycelium differs in appearance from other divisions in the life history and is regarded as the heterotypic mitosis.—Certain interesting abnormalities were observed. Aecia with reversed polarity having the chains of spores growing entad have been seen. Aecia have also been observed on the roots under several inches of loam. Double pycnial layers are not uncommon. Internal uredinia and telia also occur. All these phenomena are regarded as teratological.—The author describes in considerable detail the methods used by him in the investigation. In the preparation of minute objects such as aeciospores and telial horns for sectioning he found the use of a centrifuge advantageous. A method for imbedding such material in paraffin while in the centrifuge is described.—The paper is extensively illustrated with drawings and photomicrographs.—*H. M. Fitzpatrick.*

993. Denis, Marcel. **Sur quelques thalles d'Anéura dépourvus de chlorophylle. [Concerning certain thalli of Aneura devoid of chlorophyll.]** Compt. Rend. Acad. Sci. Paris **168:** 64–66. *Fig 1–2.* 1919.—See Bot. Absts. 2, Entry 982.

994. [Dodge, B. O.] Anonymous. **Index to American mycological literature.** Mycologia 11: 47–50. 1919.

995. Drechsler, Charles. **Morphology of the genus Actinomyces.** I. Bot. Gaz. 67: 65–83. **Same title.** II. *Ibid.* 67: 147–168. *Pl. 2–9.* 1919.—Of the probably more than 100 species examined by the author, he selects 18 for critical study of cultural and morphological characteristics. These 18 are designated by Arabic numerals and four of them are referred to previously described species, *Actinomyces XVII* being the potato scab organism, *A. scabies* (Thaxter) Güssow. Notwithstanding the minuteness of the filaments of *Actinomyces* (the diameter ranging commonly from 0.5–1.2μ), which has been apparently primarily responsible for its inclusion by most recent writers among the bacteria, the author regards the characters (the production of aerial spores, abundant branching, the appearance of vacuoles in the protoplasm, the presence of granules in the spores of many species which possess the staining properties of nuclei) as fungoid, and hence would place *Actinomyces* among the Hyphomycetes, as a mucedinous group with tendencies toward an Isarioid habit. Sporogenesis begins at the tips of the fertile branches and proceeds basipetally. The sporogenous hyphae of most species are coiled in peculiar spirals, which exhibit pronounced specific characteristics in the number, diameter, and obliquity of their turns, and especially in the direction of rotation, 11 species having sinistrorse branches, 5 dextrorse, 1 uncertain. Two tendencies in the development of the spore-bearing fructifications are recognizable (the majority of species also show intermediate tendencies): one, an erect dendroidal type, in which the sequence of sporogenesis is successive; the other, leading to a prostrate, racemose type in which sporogenesis is more nearly simultaneous. The plants were grown usually on potato or glucose agar. For permanent preparations, some of the agar bearing the fungus was cut off and applied firmly to slides smeared with albumen fixative, then carefully removed so as to transfer the mycelium from the agar surface to the slide; followed by fixation, staining (preferably with Delafield's haematoxylin), and mounting in balsam. [See Bot. Absts. 2, Entry 58.]—*E. W. Olive.*

996. Durand, Elias J. **Peziza proteana var. sparassoides in America.** Mycologia 11: 1–3. *Pl. 1.* 1919.—This variety is described and contrasted with *Peziza proteana;* the chief

differences noted are the larger size, greater complexity of masses and extreme brittleness of the flesh. The author believes this to be the same as *Gyromitra Phillipsii* Mass.—*H. R. Rosen.*

997. FROMME, F. D., AND T. J. MURRAY. **Angular leaf spot of tobacco, an undescribed bacterial disease.** Jour. Agric. Res. 16: 219–228. *Pl. 25–27.* 1919.—See Bot. Absts. 2, Entry 1035.

998. HEMMI, TAKEWO. **Vorläufige mitteilung über eine neue anthraknose von Evonymus japonica. [A new anthracnose of E. japonica.]** Ann. Phytopath. Soc. Japan 1: 9–15. 1918.—See Bot. Absts. 2, Entry 1040.

999. LEVINE, MICHAEL. **The sporadic appearance of non-edible mushrooms in cultures of Agaricus campestris.** Bull. Torrey Bot. Club 46: 57–63. *Pl. 3–5.* 1919.—Visits to the beds of many commercial mushroom growers made possible a study of various non-edible forms which appeared. Those discussed are: *Panaeolus venenosus* Murrill, *P. campanulatus* L., *P. retirugis* Fr., *Clitocybe dealbata* Sow., *Tricholoma melaleucum* Quel., *Peziza domiciliana* Cooke—*P. A. Munz.*

1000. LISTER, G. **Two new varieties of Lamproderma.** Jour. Bot. 57: 25–27. *Pl. 552.* 1919.—*L. violaceum* (Fries) Rost., var. *debile* G. Lister and Howard, and *L. atrosperum* Meylan, var. *anglicum* G. Lister and Howard described as new; both obtained by H. J. Howard in Whitlingham Woods near Norwich, England. Curious crystalline, rod-like structures, scattered over the sporangia of the former species, are discussed.—*K. M. Wiegand.*

1001. MCDOUGALL, W. B. **Development of Stropharia epimyces.** Bot. Gaz. 67: 258–263. *Fig. 1–10.* 1919.—This mushroom, parasitic on *Coprinus*, follows in its mode of development that described for the group including *Agaricus campestris* and other forms, in which the hymenophore primordium appears first, pileus and stem being differentiated later. *Stropharia* and *Agaricus* are therefore closely related genera. [See Bot. Absts. 2, Entry 736.] —*E. W. Olive.*

1002. MURRILL, WILLIAM A. **Cuban polypores and agarics.** Mycologia 11: 22–32. 1919. —A list of 151 recognizable and 5 doubtful species of Polyporaceae and 192 recognizable and 4 doubtful species of Agaricaceae, together with the substrata or hosts, is presented.—*H. R. Rosen.*

1003. ANONYMOUS. [MURRILL, W. A.] [Rev. of: BURT, E. A. **Merulius in North America.** Ann. Missouri Bot. Gard. 4: 305–362. *Pl. 20–22, fig. 1–39.* 1917.] Mycologia 11: 45–46. 1919.—Reviewer commends Dr. Burt's article and presents Dr. Murrill's field notes on *Merulius hirsutus.*—*H. R. Rosen.*

1004. PARKS, H. E. **Notes on California fungi.** Mycologia 11: 10–21. 1919.—Field data, especially habitat, on various Hymenomycetales and hypogaeous fungi are presented. Some of these are believed to be new species.—*H. R. Rosen.*

1005. PAULSON, ROBERT. [Review of: SMITH, ANNIE LORRAIN. **A monograph of British lichens: A descriptive catalogue of the species in the department of botany, British Museum. Part I.** 2nd ed. *519 p. 71 pl., 11 fig.* Printed by the Museum. 1918.] Jour. Bot. 57: 21–23. 1919.

1006. PENNELL, FRANCIS W. **Concerning duplicate types.** Torreya 19: 13–14. 1919.

1007. SAUNDERS, JAMES. **The Mycetozoa of Bedfordshire.** Jour. Bot. 57: 63–65. 1919.—A list of the species found, with localities and some habitats.—*K. M. Wiegand.*

1008. SMITH, ANNIE LORRAIN. **A monograph of British lichens: A descriptive catalogue of the species in the department of botany, British Museum. Part I.** 2nd ed. *519 p., 71 pl., 11 fig.* Printed by the Museum. 1918.—Rev. by R. PAULSON in: Jour. Bot. 57: 21–23. 1919.

1009. Stakman, E. C., and M. N. Levine. **Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis.** Jour. Agric. Res. 16: 43–47. 1919.—See Bot. Absts. 2, Entry 1081.

1010. Stevens, F. L., and Nora E. Dalbey. **New or noteworthy Porto Rican fungi.** Mycologia 11: 4–9. *Pl. 2–3.* 1919.—Two new genera, *Septoriopsis* and *Wageria*, are described with *S. Chamaesyceae* and *W. portoricensis* as the type species, the former genus belonging to the Tuberculariaceae-Scolecosporae and the latter to Perisporiaceae-Phaeodidymae. The following seven other new species are described: *Septoriopsis Piperis, Exosporium Leucaecae, Ramularia Mimosae, Haplographium portoricense, Microclava Coccolobiae, Mycosphaerella subastoma, Stephanoma Melioliae.—H. R. Rosen.*

1011. Vincens, F. **Quelques maladies des plantes cultivées au Parà (Brésil). [Some diseases of the cultivated plants of Para, Brazil.]** Bull. Soc. Path. Veg. France 5: 45–55. *Fig. 1–5.* 1918. See Bot. Absts. 2, Entry 1093.

1012. Williams, R. S. **Notes on some western lichens.** Bull. Torrey Bot. Club 46: 21–25. 1919.—A report is made on a collection of lichens made in the Yukon region in 1898 and 1899, and on one made in Montana in 1897. Various species are listed and corrections made of the reports published by others on the same material.—*P. A. Munz.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

1013. MacCaughey, Vaughan. **The pala or mule's-foot fern (Marattia Douglasii (Presl) Baker) in the Hawaiian Archipelago.** Torreya 19: 1–8. 1919.—See Bot. Absts. 2, Entry 979.

1014. Scott, D. H. **On the fertile shoots of Mesoxylon and on the allied genus.** Ann. Bot. 33: 1–21. *Pl. 1–3, fig. 1–3.* 1919.

PATHOLOGY

Donald Reddick, *Editor*

1015. Åkerman, Å. **Iakttagelser rörande stråfusariose på vårvete sommaren 1917. [Specific resistance of different varieties of spring wheat to Fusarium culmorum.]** Sveriges Utsädesf. Tidskr. 28: 82–89. 1918.—Spring wheat in southern and central Sweden suffered severely in 1917 from attacks by *Fusarium culmorum.* This was due to (1) infested seed developed in the damp, rainy weather of the preceding harvest and (2) the great drought in the spring of 1917 which weakened the seedlings and made them more susceptible. Nine varieties are named, by number, which possessed immunity or resistance and 5 which were especially susceptible.—Differences in susceptibility were confirmed by numerous controlled experiments. The cause of the difference is not known, but there is no relation between earliness of maturity and susceptibility. Possibly it is due to the structure of the flower or the presence of substances toxic to *Fusarium.* [From abst. in: Internat. Rev. Sci. and Pract. Agric. 9: Entry 1297. 1918.]—*D. Reddick.*

1016. Anonymous. **Wart disease of potatoes.** Rept. Bd. Agric. Scotland (1917) 6: lx–lxii. 1918.—Potato wart (*Chrysophlyctis*) was reported from twice as many gardens and farms as in 1916. Use of poor planting stock, and use of infested land, under the war stimulus, are thought to account for this; also the variety Arran Chief, a very susceptible variety, was planted extensively.—According to law, license must be secured before infested land may be planted to potatoes and only resistant varieties may be used. A list of such varieties is mentioned.—*D. Reddick.*

1017. Anonymous. **American gooseberry mildew.** Rept. Bd. Agric. Scotland (1917) 6: lxii. 1918.—"The practice of dipping bushes in a solution of lime-sulfur solution before despatch to customers, which the Board recommended last year to occupiers of infected nurseries, has been found to be very efficacious in preventing the spread of the disease from these premises."

1018. ARNAUD, G. **Le mildou des lilas et la maladie des cotylédons d'érable. [The lilac mildew and a disease of maple cotyledons.]** Bull. Soc. Path. Veg. France 5: 58–60. 1918.—*Phytophthora syringae* is reported as occurring at the Pathological station in Paris. *Botrytis cinerea, Heterosporium syringae, Cladosporium herbarum* and *Dematium pullulans* are also reported on the same host. *Cercosporella acerina* attacks cotyledons of *Acer* sp. causing brown spots and final decay.—*C. L. Shear.*

1019. AVERNA SACCÁ, ROSARIO. **Exame microscopico das jaboticabas enviadas pela directoria de agricultura. Ferrugem das jaboticabeiras. [Rust of jaboticaba.]** Bol. Agric. São Paulo 19: 68–69. 1918.—*Uredo* sp. found on leaves of jaboticaba [*Myrciaria jaboticaba?*]. One or two treatments with bordeaux mixture should give control. Cultural practices that will aid in control are good air drainage and fertilization with phosphate to increase vigor of host.—*D. Reddick.*

1020. AVERNA SACCÁ, ROSARIO. **Molestia das viderias. [Diseases of grapes.]** Bol. Agric. São Paulo 19: 214–220. *3 fig.* 1918.—Anthracnose caused by *Gloesporium ampelophagum,* occurs destructively on *Vitis rupestris du Lot, V. rupestris paulista* and on the varieties Seibel and Niagara.—Another kind of anthracnose appeared on Niagara in 1918, caused by *Gl. physalosporae.* Sulfate of iron treatment is recommended.—*D. Reddick.*

1021. AVERNA SACCÁ, R. **Molestias encontradas sobre as folhas de fumo e de gergelim provenientes de Soccorro (Pernambuco) remettidas pela directoria de agricultura. [Foliage diseases of tobacco and gergelim.]** Bol. Agric. São Paulo 18: 984–986. 1917. [Reprinted Bol. Agric. São Paulo 19: 70–71 1918.]—Tobacco leaves from Pernambuco were found affected with *Cercospora solanicolum.* The numerous spots on the leaves rendered them nearly worthless. The disease appears in damp, shady places. Various species and varieties differ in their susceptibility. Since fungicides would injure the quality of the tobacco it is recommended that resistant varieties be used and that the plantation be arranged with reference to suitable air drainage.—A leafspot of *Sesamum indicum* (*Gergelim*) was found in which a species of *Cercospora* occurred. [From abst. in: Internat. Rev. Sci. Pract. Agric. 9, Entry 1058. 1918.]—*D. Reddick.*

1022. BELGRAVE, W. N. C. **Experiments on the prevention of brown bast.** Agric. Bull. Fed. Malay States 6: 187. 1918.—Experimental soil treatments for the control of "brown bast" [of rubber (?)] are suggested.—*J. Rosenbaum.*

1023. BELGRAVE, W. N. C., AND F. W. SOUTH. **Field notes and observations on brown bast.** Agric. Bull. Fed. Malay States 6: 181–186. 1918.—An unknown disease of rubber trees found in the Malay States and Sumatra is described. Partial remedies are suggested.—*J. Rosenbaum.*

1024. BOIS, D. **Sur deux maladies des pommes: Water-core (Pommes vitreuses), Bitter Pit (Taches amères). [Two diseases of apples, water-core and bitter pit.]** Bull. Soc. Path. Veg. France 5: 34–41. 1918.—The author mentions the occurrence of these two diseases in France and gives a brief summary of the results of the principal investigations which have been made by previous writers, with citations of the most important papers published.—*C. L. Shear.*

1025. BROOKS, CHARLES, J. C. COOLEY, AND D. F. FISHER. **Apple scald.** Jour. Agric. Res. 16: 195–217. *11 fig.* 1919.—See Bot. Absts. 2, Entry 1143.

1026. BURNHAM, STEWART H. **Charles Horton Peck.** Mycologia 11: 33–39. *Fig. 1.* 1919.

1027. Butler, E. J. **Immunity and disease in plants.** Agric. Jour. India (Special Indian Science Congress Number) *p. 10–28.* 1918.—It is necessary to distinguish between the avoidance of disease, the endurance of disease, and true immunity or resistance to disease. Several instances are given of the ways in which plants may avoid a disease to which they are not in any way truly resistant. They may be grown in areas with conditions of climate which the parasite cannot stand, it being shown that many of our most important cultivated plants have a wider range than their parasites. Or the date of sowing may be altered to a period when the temperature or humidity is unsuitable for the germination of the spores of the parasite. Or varieties may be grown which mature quickly, before the parasite can do them much damage. Cases are given of successful endurance of the attacks of a plant parasite. These are mostly connected with the vigour of the plant, and can be modified by different methods of cultivation and manuring.—True resistance to disease differs from the above in depending on some structural or physiological characters of the plant which prevent successful invasion by the parasite. The structural characters of importance in specific cases are detailed and examples given. The physiological characters which influence immunity are more difficult to define, but are undoubtedly the most important class of factors in the majority of cases. They are connected with the nature of the cell contents, not with the characters of the walls or other structural peculiarities. Sometimes the living part of the contents—the protoplasm—is chiefly involved; sometimes the non-living part—usually substances dissolved in the cell sap—is more important. Amongst these substances, tannin and organic acids are shown to occupy a prominent place.—The relative resistance to specific diseases of different varieties of plants is discussed, and indications given of the physiological characters most probably concerned.—The external conditions which modify physiological resistance are chiefly climatic and nutritional. Resistance in one locality does not necessarily imply resistance to the same disease in another locality. Soil is often important, the influence of calcareous soils being particularly evident in several diseases. Nutrition often has a strong influence on disease and there is a very wide field for further research in this direction. It is shown that all three of the more important plant foods obtained through the roots—nitrogen, phosphorus, and potassium—may, according as they are present in excess or are deficient, have a marked influence on susceptibility to disease. How they act is not known and attention is drawn to this problem as one on which Agricultural Chemists might throw much light if they could show how specific fertilizers influence the chemical composition of the plant cell.—*Wm. McRae.*

1028. Capus, J., and J. Feytoud. **Note sur une maladie du noyer. [Note on a disease of the walnut.]** Bull. Soc. Path. Veg. France 5: 61–63. 1918.—The disease occurs on the cultivated walnut about Terrasson, France. Affected plants show yellowing of the leaves, the tips of the branches die, and in a few years the trees are dead. A fungus, believed to be *Armillaria mellea,* is found on the roots. This has been considered the cause of the disease.—*C. L. Shear.*

1029. Carsner, Eubanks. **Angular leafspot of cucumber: dissemination, overwintering and control.** Jour. Agric. Res. 15: 201–220. *Pl. 13–16.* 1918.—*Bacterium lacrymans* on *Cucumis sativus* causes angular spots on leaves and circular, water-soaked spots on fruits. The disease is widely distributed and the losses from it places it among the diseases of major importance for cucumbers.—Infection on leaf and fruit is by way of stomates. Inoculations made at different hours show that infection occurs chiefly during the day rather than at night, and this is probably correlated with stomatal movement.—The organism is disseminated chiefly by rain, but pickers and probably insects play a part in the process. It is readily killed in artificial media by freezing, and by heat at 50° for 10 minutes. It is readily killed by the common germicides. The bacteria are sensitive to desiccation but have been found to persist for 7 months on seed and it is thought that this is the common method of over-wintering.—No resistant varieties have been found. Sanitary measures with reference to picking may prove helpful in control but seed treatment offers the greatest hope of economical control of the disease.—*D. Reddick.*

1030. Colley, Reginald H. **Parasitism, morphology and cytology of Cronartium ribicola.** Jour. Agric. Res. 15: 619–659. *Pl. 48–59.* 1918. See Bot. Abst. 2, Entry 992.

1031. Davis, W. H. **Chlorotic corn (A progress report).** Proc. Iowa Acad. Sci. 24 (1917): 359–460. 1918.—Chlorotic corn plantlets have been noticed for a number of years. Numerous infection experiments with sap from sick plants of the supposed organism were made, but the results were negative. The roots appeared normal while the chlorotic leaves die. One case was noted where new leaves seemed to contract the disease. Seemingly warranted conclusions are that the embryos of corn may be chlorotic.' Chlorosis may not be transferred by contact or sap. When plantlets are entirely chlorotic they will not mature.—*I. E. Melhus.*

1032. Denis, Marcel. **Sur quelques thalles d'Aneura dépourvus de chlorophylle. [Concerning certain thalli of Aneura devoid of chlorophyll.]** Compt. Rend. Acad. Sci. Paris 168: 64–66. *Fig. 1–2.* 1919.—See Bot. Absts. 2, Entry 982.

1033. Dufrénoy, J. **Les réactifs biologiques de l'espèce et la spécificité parasitaire. [Biological tests of species and parasitic specificity.]** Rev. Gén. Sci. 30: 44–47. 1919.—Review of recent literature on biological species, especially that of Stakman and co-workers. [See Bot Absts. 3, Entry 822.]—*D. Reddick.*

1034. Dufrénoy, Jean. **The biological significance of false witches'-brooms in Ericaceous plants.** Jour. Washington Acad. Sci. 8: 527–532. 1918.—Witches'-brooms showing infection with *Exobasidium unedonis* Maire, *Gloeosporium conviva* Maire and *G. myrtillus* n. sp. occur on *Arbutus unedo.*—Regarding the assumption that mycelia growing in the vascular tissue hinder the ascent of water and result in partial starvation of the leaves, the author states that the vessels are never obstructed by the fungi mentioned. Infected leaves are rolled up and present less surface to transpiration. They also contain red coloring matter which might cause modification of transpiration. Experiments indicated that the leaves of the diseased shoots show greater transpiration than normal leaves. This is regarded as due to the diseased leaves remaining juvenile while the sound leaves become thickly cutinized. Insoluble carbohydrates were scarce in the diseased tissues.—Glucocides were found in the sound tissues but were lacking in those infected with *Gloeosporium.* As the false witches'-brooms possess very low if not fully inhibited power of assimilation and are shorter lived than healthy shoots, they cannot be interpreted as symbiotic organisms as suggested by Vuillemin.—*C. L. Shear.*

1035. Fromme, F. D., and T. J. Murray. **Angular leaf spot of tobacco, an undescribed bacterial disease.** Jour. Agric. Res. 16: 219–228. *Pl. 25–27.* 1919.—An epiphytotic occurred in the tobacco (*Nicotiana tabacum*) fields of Virginia in 1917. This was a season of heavy rainfall and subnormal temperature. In many fields every plant was affected and fully half the crop rendered unfit for harvest. Vigorous plants invariably were more affected than weak ones.—Lesions occur only on the leaves and are most abundant on the top and middle leaves. The spots are angnlar and may reach 8 mm. in diameter. As many as 500 spots may be found on a heavily infected plant.—Bacteria were isolated readily and inoculations made on plants in the greenhouse, with the atomizer, by smears, or by needle pricks, were successful. Vigorous plants showed the most lesions and the incubation period was shortest (4 days) in them. Average incubation period 7 days.—The organism does not seem to have been previously described and the name *Bacterium angulatum* is proposed for it. Cultural characters are stated briefly. Group number 211.2322033.—*D. Reddick.*

1036. Gabotto, L. **La peronospora del mais. [Mildew of maize.]** Il Coltivatore 64: 331–333. *3 fig.* 1918.—Plants attacked by *Sclerospora macrospora* presented not only a weakly appearance but had virescent male flowers and no ears. [From abst. in: Internat. Rev. Sci. and Pract. Agric. 9, Entry 1053. 1918.]—*D. Reddick.*

1037. Gardner, M. W. **Anthracnose of cucurbits.** U. S. Dept. Agric. Bull. 727. *68 p., 15 fig.* 1918.—A monographic treatment of the disease in all phases. The work of others to date is brought together and from observation and experiment numerous contributions are made.—The life history of the fungus, *Colletotrichum lagenarium*, has been studied minutely and important stages are illustrated. The nutrition of the fungus is reported in some detail.—The fungus has been found in soil under diseased plants and in surface drainage after rains. Evidence is presented that the fungus overwinters in the field and that it may be carried on the seed. Spraying does not afford an effective control. [See Bot. Absts. 1, Entry 1666.]—*H. W. Dye.*

1038. Giddings, N. J. **Infection and immunity in apple rust.** West Virginia Agric. Exp. Sta. Tech. Bull. 170: *71 p., 11 pl.* 1918.—A brief summary of previous work on *Gymnosporangium juniperi-virginianae* and the disease it produces, is given. The exact dates on which apple leaves became infected were determined. A number of leaves were exposed to and the same number protected from infection each day. A careful record of the development of the rust galls on the cedar, of meteorological conditions and of the development of apple foliage was kept. It was found that an abundant discharge of sporidia was not necessarily followed by a serious rust outbreak, since there might be a lack of sufficient air movement for their wide dispersal or unfavorable temperature or humidity conditions might prevent infection. The optimum temperature for infection is thought to be about 65° F. Few sporidia were discharged at 50° F.—A study of leaf growth as related to susceptibility showed that those apple leaves which grew after being inoculated usually became infected while leaves which made no further growth were for the most part immune. A list of the varieties of apples susceptible to rust, is given. There seems to be considerable individual variation in the resistance of apple trees of the same variety. This difference is also shown by cedar trees as indicated by the fact that one tree may bear a large number of galls, while another tree of the same kind standing close beside it may have few or no galls. Data presented show that the greatest injury to apples is due to the loss of foliage with consequent loss of vitality. A distinct correlation was found between the number of rust spots on the leaves and the rate of leaf fall.—It was found that apple rust could be controlled by the common spray mixtures, if applied within a day or two before the infection period. The removal of the red cedar trees, however, seems to be the only practical method of controlling this disease in commercial apple orchards.—*J. L. Weimer.*

1039. Guillochon, L. **Une maladie cryptogamique du fruit de la tomate. [A fungous disease of tomato fruit.]** Bull. Soc. Hortic. Tunis 16: 131–133. 1918.—A fungous disease of tomatoes has been noted in different gardens which is attributed to *Phoma destructiva.* Various insects were found to be responsible for the spread of the disease.—*J. Rosenbaum.*

1040. Hemmi, Takewo. **Vorläufige mitteilung über eine neue anthraknose von Evonymus japonica. [A new anthracnose of E. japonica.]** Ann. Phytopath. Soc. Japan 1: 9–15. 1918.—A fungus described as *Gloeosporium evonymicolum* Hemmi, n. sp. causes spots on the leaves of the host, which gradually die and fall. Inoculation experiments show that the fungus is able to penetrate the uninjured epidermis of leaves of *Evonymus japonica* and of *E. radicans.* —*H. A. Edson.*

1041. Henning, Ernst. **Anteckningar om s. k. Slidsjukan med anledning av dess uppträdande a vete 1915 och 1918. [Notes on the socalled sheath disease with reference to its occurrence on wheat in 1915 and 1918.]** K. Landtbr. Akad. Handl. och Tidschr. 57: 418–426. *Fig. 1–3.* 1918.—The sheath disease of wheat is a physiological disease and may be caused by climatic conditions, soil conditions, and insects. The dry weather, strong winds, and heavy frosts in Sweden during the summer of 1915 and 1918 were responsible for heavy losses, especially in northern, eastern, and southern sections. Unfavorable soil conditions, such as poor fertilizing, light sandy soils, badly washed soils, soils that favor drouth, etc., favor the development of the disease.—The plants may become diseased at different stages of its growth. Usually, however, the disease begins the latter part of May and reaches its highest development by midsummer (June 24), the plants becoming stunted and finally ceasing growth. The upper leaves, sheaths, and parts of the culms become yellow or gray-violet, and the upper leaves are often spiral. The culms are normal below, shrunken above, the heads poorly filled, and the kernel shrunken and dried up, and finally the leaves, sheaths, and heads are covered with saprophytic mold. New shoots often grow from the base of stunted plants.—Recommendations for control: Good soil conditions, early varieties of wheat, not too early planting, and rotation with rye.—*J. I. Lauritzen.*

1042. HORI, S., AND U. BOKURA. **Soy bean cake as a substitute for peptone in the preparation of the nutrient media.** Ann. Phytopath. Soc. Japan 1: 27–30. 1918.—Soy bean cake, largely imported from China as a nitrogenous fertilizer, has been found a satisfactory substitute for peptone in media for general use as well as for the cultivation of such animal pathogens as the mouse typhus bacteria. Extract from 30 grams replace 20 grams of peptone. From the analysis it appears that the chief nourishing component is crude protein (caseine). This is precipitated by acid, and soy bean cake is not suited for the preparation of acid media. Sodium carbonate is used to give an alkaline reaction in preparing bouillon. [See Bot. Absts. 2, Entry 316.]—*H. A. Edson.*

1043. HUBERT, ERNEST E. **Fungi as contributory causes of windfall in the Northwest.** Jour. Forestry 16: 696–714. 1918.—The force of the wind is classified as the primary cause of windfalls, and all other causes, such as cutting operations, fungi, soil, fire, snow, height of trees, size of crowns, exposure, etc., are classed as secondary causes. Cutting operations and soil conditions take first place in importance as causing windfall damage, fungi second, exposure third.—Fungi as secondary causes play an important part in causing windfall. A large amount of damage to National Forests and the remaining forest region as well, reckoned upon a financial basis, is annually sustained through windfall; a considerable portion of this loss can be traced to fungous action alone.—Fungous attack is largely responsible for windthrow in western white pine, one of the most important timber trees. It is also a menace through windthrow to all stands of infected timber left as thinned stands or as seed trees after cutting operations.—The principal fungi concerned in causing windfall are *Polyporus schweinitzii*, *Trametes pini*, *Echinodontium tinctorium*, *Fomes annosus*, *Armillaria mellea*, and *Sparassis radicata.*—Recommendations are made that all trees marked to be reserved in selection cuttings or as seed trees upon a cutover area are to be free from root, butt and trunk rots. A bibliography of 26 titles is appended.—*Ernest E. Hubert.*

1044. JOHNSTON, JOHN R., AND STEPHEN C. BRUNER. **Enfermedades del naranjo y otras plantes citricas. [Diseases of the orange and other citrus plants.]** Bol. Estac. Exp. Agron. Cuba 38: 1–54. *15 pl.* 1918.—All of the diseases affecting citrus plants known to occur in Cuba are considered, together with the injuries due to the rust mite and to red spiders but, as the authors point out, considerable data are still lacking and several years of uninterrupted investigation will be necessary before the cause and means of controlling several of the more important diseases can be determined. The following troubles are treated in this report: fruit-rot, dieback, and gummosis due to *Diplodia natalensis;* anthracnose and withertip (*Colletotrichum gloeosporioides*); withertip of limes due to *Gloeosporium limetticolum;* scab (*Cladosporium citri*); fruit rots due to *Penicillium italicum* and *P. digitatum;* blossom end rots attributed to *Alternaria* (*citri*) and *Colleotrichum gloeosporioides;* end rot of Persian limes (cause not determined); citrus knot (*Sphaeropsis tumefaciens*); rust mite (*Eriophyes oleivorus*); red spiders (*Tetranychus sexmaculatus*, *T. mytilaspidis*, *Tenuipalpus californicus*, and *Tarsonemus latus*); foot-rot, evidently due in part to *Phytophthora* (*terrestria?*); gummosis; psorosis; Ceballos "scab" disease (cause unknown); black melanose or greasy spot; melanose (*Phomopsis citri*)—not known to occur in Cuba; chlorosis and mottled leaf: spots on leaves, fruit and twigs due to the alga *Cephaleuros;* damping-off (*Rhizoctonia* and *Sclerotium*); sooty mold (*Capnodium citri*); citrus canker (*Pseudomonas citri*)—not known to occur in Cuba; and various troubles of minor importance in Cuba including "buckskin," "blight," round spots on fruit, fruit gummosis, and lichens.—*S. C. Bruner.*

1045. KROUT, W. S. **Report on diseases of celery.** New Jersey Agric. Exp. Sta. Rept. 1916: 584–603. 1918.—Experiments in treatment of seed beds and in the control of rots and also field spraying experiments for the control of *Cercospora apii* and *Septoria petroselini* var. *apii.* The soil organisms were controlled in the seed beds by the use of formaldehyde.

Soil sterilization in the field by the use of steam was successful and some chemicals proved to be slightly germicidal in the treatment of soil. Bordeaux mixture was the most satisfactory treatment for the control of the early and late blight.—*M. T. Cook.*

1046. Kunkel, L. O. **A method of obtaining abundant sporulation in cultures of Macrosporium solani E. & M.** Mem. Brooklyn Bot. Gard. 1: 306–312. *4 fig.* 1918.—Undisturbed cultures rarely produce spores but if the mycelium is wounded, when the culture is 2 or 3 days old, abundant sporulation is induced. The wounding may be accomplished by scraping the surface of a culture with a scalpel or even with a strong platinum needle. The more thoroughly the scraping is done the greater will be the quantity of spores produced.—Spores in chains of two are rarely observed in cultures which are fruiting vigorously.—Study of *M. solani*, *M. tomato* and *M. daturae* in pure culture shows many differences especially in the morphology of spores and they are believed to be distinct species.—*D. Reddick.*

1047. Lees, A. H. **"Reversion" and resistance to "big bud" in black currants.** Ann. Appl. Biol. 5: 11–27. *Pl. 3–6.* 1918.—"Reversion" is characterized by one or more of the following characters: the fruit "runs off," i.e., at picking time either there are no berries left or only a few undersized fruits remain; there is an extensive growth of laterals resulting in a crowded, instead of an open form of bush (one of the most characteristic signs of a reverted bush); the internodes are long and thin; the leaf is sharp pointed and abnormally narrow.—Author observes that "reversion" occurs most frequently amongst mite attacked bushes. In cases where numerous mites make an attack, the result is a condition known to growers as "oak leaf," and is a certain sign of a mite infested terminal. This condition is followed by a forcing of some of the lower lateral buds. Mite resistance was observed in Seabrook's Black, and its resistance is accounted for through its high susceptibility; the mite kills the growing point in an attacked bud and as a result cuts off the food supply and thus starves itself. [See Bot. Absts. 2, Entry 322.]—*L. R. Hesler.*

1048. Lemee, E. **Balai de sorcière sur Pirus communis. [Witches'-broom on Pyrus communis.]** Bull. Soc. Path. Veg. France 5: 32–33. 1918.—Witches'-brooms found on pear trees in France are described. They are supposed to be caused by an undetermined fungus, the mycelium of which was found in the diseased parts.—*C. L. Shear.*

1049. Lind, J., and F. K. Ravn. **Forsøg med midler mod byggets stribesyge. [Disinfection of seed against Pleospora graminea, injurious to barley.]** Tids. Planteveal 25: 56–116. 1918.—Extensive investigations have been made to determine the best method of disinfecting seed barley against *Pleospora graminea.*—If proper precautions are observed good results are secured by treating the seed in one of the following solutions: (1) Soak 6 hours in 0.2 per cent formaldehyde solution; (2) or 4 hours in 0.5 per cent copper sulfate solution; (3) or 2 hours in 0.1 per cent mercuric chlorid solution. If seed is not badly affected the time of soaking may be reduced one half.—Various hot water treatments were tried and while fairly effective none was so good as any of the 3 above-named solutions.—Early sowing in cold soil favors the development of the disease.—[From abst. in: Internat. Rev. Sci. Pract. Agric. 9, Entry 1302. 1918.]—*D. Reddick.*

1050. Mackie, D. B. **Some observations on citrus canker.** California Citrograph 3: 231, 244–245. 1918.

1051. Martin, W. H. **Tomato spraying experiments at Riverton, N. J.** New Jersey Agric. Exp. Sta. Rept. 1917: 540–561. *2 pl.* 1918.—Cöoperative experiments for the control of tomato leaf spot (*Septoria lycopersici*) begun in 1916 were continued. The scope of the work was broadened to include tests of several modifications of Bordeaux mixture as well as to determine the relative merits of traction and power sprayers.—The sprays tested controlled the leaf spot in the following order: (1) 4: 2: 3: 50, (2) 4: 4: 3: 50, (3) 0.5: 0: 3: 50, (4) 4: 4: 50, (5) 2: 0: 4: 3: 50 (the third digit referring to pounds of resin fish oil soap). While the Bordeaux soap mixtures gave best control the standard Bordeaux mixture gave greatest returns. The copper-resin fish oil soap proved very efficient. Pickering's Bordeaux mixture proved to be of little value.—Little difference resulted from the use of the power and traction sprayers; the latter, due to its lower cost of up-keep would appear the better.—Early spray applications for the control of leaf spot do not appear to be essential under New Jersey conditions. The results indicate that if a majority of the leaves are held until frost a large part of the fruit formed will not ripen. The advisability of spraying late varieties of tomatoes under certain conditions is questioned. The results emphasize the importance of spraying at the proper time.—*W. H. Martin.*

1052. MARTIN, W. H. **Tomato spraying experiments at Salem, N. J.** New Jersey Agric. Exp. Sta. Rept. 1916: 575–583. *1 fig.* 1918.—A report of spraying experiments for the control of leaf spot of tomatoes, caused by *Septoria lycopersici*. The work was designed to determine (1) the best strength of Bordeaux mixture to be used; (2) the proper time to make the applications.—The 4: 4: 50 mixture gave best results. All the sprays tested gave increased returns over the unsprayed plots. While the results obtained tend to favor early applications this is due, in large part, to the protection afforded the young plants from insect injury. Fruits from sprayed plants had a better color and firmer texture than fruit from similar, unsprayed plants. The results indicate that spraying has little, if any, influence on tomatoes grown for the cannery or late market.—*W. H. Martin.*

1053. McMURRAN, S. M. **Preventing wood rot in pecan trees.** U. S. Dept. Agric. Farmers' Bull. 995. *8 p.* 1918.

1054. McRAE, W. **Phytophthora Meadii n. sp. on Hevea brasiliensis.** Mem. Dept. Agric. India, Bot. Ser. 9: 219–273. *Pl. 1–3, 3 fig.* 1918.—A disease of *Hevea brasiliensis* in India, caused by an apparently new species of *Phytophthora*, is described. Detailed symptoms of the disease as it occurs in the field as well as microscopic characters of affected tissues are given. The fungus was obtained and grown in pure culture. Inoculation experiments were performed on the various parts of the host and the fungus reisolated from the artificially infected parts. While in nature the fungus has been found only on *Hevea brasiliensis*, artificial infections have been induced on *Manihot glaziovii* and *Ricinus communis*. Morphological comparisons with other described species of *Phytophthora* convince the writer that it is a new species and it is designated as *Phytophthora Meadii* n. sp. The fungus during the dry season is found as mycelium in the dead branches and as oospores in the dried-up fruits. Removal of diseased branches and fruit, and the destruction of the flowers in order to prevent the formation of fruit, are suggested as possible remedies.—*J. Rosenbaum.*

1055. McRAE, WILLIAM. **A new species of Phytophthora parasitic on the Para rubber tree.** Jour. Bombay Nat. Hist. Soc. 25: 760. 1918.

1056. MEIER, F. C. **Relationship of fungous diseases to the watermelon industry.** Off. Minutes Melon Distributors' Assoc. 4: 19–28. 1918.

1057. MELHUS, I. E., AND J. C. GILMAN. **An improved method of potato seed treatment.** Iowa Agric. Exp. Sta. Circ. 57. *8 p., 9 fig.* 1919.—A brief discussion is given of the occurrence of black leg, black scurf, common scab, and dry rots of the potato. The hot formaldehyde method for potato seed treatment is described and recommended as a control measure. This consists of dipping the seed in a hot formaldehyde solution for 2 minutes at 48° to 50°C., piling the potatoes 6 to 8 inches deep and covering for one hour.—*I. E. Melhus.*

1058. METCALF, HAVEN. **The problem of the imported plant disease as illustrated by the white pine blister rust.** Mem. Brooklyn Bot. Gard. 1: 327–333. *Pl. 6–7.* 1918.—A brief history of white pine blister rust, caused by *Cronartium ribicola*, particularly its introduction and spread in U. S. A.—"The entire blister rust problem is, however, but one phase of a larger problem, which may be stated as follows: does free trade in plant diseases and insect pests pay? Is it an economically sound national policy? Is the entire importing nursery business worth as much to the country as the damage which it has already caused? Not a single plant disease or insect pest that has once become established in this country has been eradicated or, in the present state of knowledge, is ever likely to be. No matter how well controlled, it remains in every case a permanent tax against our economic resources. Even if we succeed in controlling the white pine blister rust we may be absolutely certain that other diseases and pests are being introduced which will be just as serious, for we know definitely that the undesirable plant immigrants are not yet all here. It is much more important to safeguard the country against further invasions of this kind than to control this or any other disease or pest that has already been carelessly permitted to establish itself."—*D. Reddick.*

1059. Metcalf, Haven. **Summary of the white-pine blister rust situation.** Jour. Forestry 16: 85–89. 1918.—Remarks at the close of the conference of the Committee on the suppression of Pine Blister Disease in North America, held at Pittsburgh, Pennsylvania, Nov. 12, 13, 1917. [See Bot. Absts. 1, Entry 137.]

1060. Mottet, S. **La dégénérescence des pommes de terre. [Degeneration of potatoes.]** Jour. Agric. Prat. 31: 327–329. 1918.—Degeneration is considered a grave malady of the potato, threatening to exterminate many varieties. No definite causes of this trouble have been established, but they are supposed to be complex and diverse. An important rôle is attributed to the continuous planting of the same stock on the same soil. *Filosité* (spindly sprout) and *boulent* (failure to germinate) are said to be the two general and characteristic manifestations of the disease. The writer reviews certain previous literature on this subject, appearing in England, Germany, and France. He names a number of varieties for the support of the theory that the smooth-eyed varieties are less resistant than the deep-eyed varieties, although exceptions are given. The effect of continued asexual propagation is admitted, but attention is called to the fact that there, too, is a marked difference in resistance. Much importance in combating degeneration is attached to the frequent renewal of seed potatoes, which should be introduced preferably from cool regions every three or four years at least. As additional measures the author suggests sunning of the seed tubers for germination, rejection of all the spindly sprout specimens, selection of more vigorous and healthy hills, and repeated spraying to prevent other contributing diseases. If in spite of all this care varieties run out, it is best to discard them altogether.—*H. A. Edson.*

1061. Nowell, William. **Infection of orange fruit through bug punctures.** Agric. News, Barbados 17: 142. 1918.—The sweet orange has been added to the list of fruits serving as hosts for the fungi associated with the internal boll disease of cotton. *Nematospora* sp., the species *D* of Nowell, was found in the pulp near the surface of an orange purchased in Barbados and said to have come from Grenada.—*D. Reddick.*

1062. Nowell, William. **Fomes lucidus as a parasite of trees.** Agric. News, Barbados 17: 46. 1918.—Brief note on the occurrence of *F. lucidus* on *Pithecolobium saman* and *P. unguis-cati* with a review of recent literature on the subject.—*D. Reddick.*

1063. Paine, Sydney G. **Internal rust spot of the potato tuber (Preliminary communication).** Ann. Appl. Biol. 5: 77–79. 1918.—Brownish red spots which characterize the disease are distributed throughout the flesh of the tuber. They consist of cells with thickened and strongly liquified walls containing brown protoplasm in which starch grains may be embedded or the starch may be replaced by globules of oil or tannin. The symptoms of the disease correspond exactly with those described by Horne (Jour. Agric. Sci. 3: 323) as internal disease, and by Mayer (Journ. für Landwirtschaft 55: 301), A. B. Frank (Kampfbuch g. d. Schädlinge unserer Feldfruchte, Berlin, 1897, p. 211), Sorauer and Rorig (Pflanzenschutz. Berlin, 1910, p. 154), B. Frank (Ber. Deut. Bot. Ges. 16: 287), as "Buntwerden," "Eisenfleckigkeit," "Buntheit," and "Stockfleckigkeit." An organism has with difficulty been isolated and shown to be the cause of the disease which has hitherto been regarded as physiological.—*H. A. Edson.*

1064. PAINE, SYDNEY G. **An epitome of bacterial diseases of plants in Great Britain and Ireland.** Ann. Appl. Biol. 5: 62–67. 1918.—Bibliography of 50 citations.—Bacterial diseases which have been studied are white rot of turnips and other vegetables, *B. carotovorus;* heart rot of celery, *B. carotovorus;* black leg of potato, *B. atrosepticus;* hyacinth yellows, *P. hyacinthia;* black rot of crucifers, *P. campestris;* a disease of *Pisum sativum* caused by *P. seminum* Cayle, which is present in the cotyledons, germinates with the seed, passes up the stem in the mobile stage, and is found in the seed pod; and a bacterial blight of peach blossoms which was discovered to be of bacterial origin by BARKER AND GROVE in 1913. The disease and causal organism are described briefly and the opinion is expressed that the organism, which is not mentioned by name, is identical with one obtained by Doidge in South Africa from a similar disease. Potato scab, crown gall, brown rot of potato, and Iris rot, all probably identical with the American diseases of the same names, are present but uninvestigated. Bacterial blight (blossom end rot) of tomatoes, orchid leaf spot, leaf roll of potato, mosaic of tomato, sprain of potatoes, and silver leaf disease are also included as of probable or possible bacterial origin.—*H. A. Edson.*

1065. PAMMEL, L. H. **The extermination of the common barberry to prevent crop leakage due to stem rust.** Iowa Conservation 2^1: 4–8. 1918.—A review of the literature is given on stem rust (*Puccinia graminis*) and the object of the barberry eradication campaign as carried on in Iowa and the spring wheat district of the Middle West.—*I. E. Melhus.*

1066 PANTANELLI, E., **Sul la resistenza delle piante al freddo. [On the resistance of plants to cold.]** Atti R. Accad. Lincei, Cl. Sci. Fis., Mat. e Nat., Rend. V, 27^1: 126–130, 148–153. 1918.—See Bot. Abst. 2, Entry 1135.

1067. PETCH, T. **The application of preservatives to renewing bark of rubber.** Trop. Agric. 51: 40–45. 1918.—Experiments were performed to determine what amount of injury is caused to renewing bark by various preservatives.—The extent of penetration was determined microscopically. It varies from no penetration to 0.8 mm., according to the material used. Maximum penetration has occurred within 10 days after the date of treatment. The following substances were used, usually full strength and in several dilutions or in mixtures: coal tar, liquid fuel, "Brunolium," "Brunolium plantarium," "Carbolineum plantarium," "Jodelite," "Izal," coke-still residue, "Cargill's" mixtures "A" and "B." None produced injury and there was no spontaneous exudation of latex following treatment. The liquids are easiest to use. "Brunolium," "B. plantarium," "Carbolineum plantarium" and "Jodelite" in 20 per cent strength are used to cure bark rot. They are to be applied as soon as the disease appears and 6 applications are made at intervals of 3 days. These materials in 5 per cent solution are used to prevent bark rot (black stripe). They are applied after every tapping.—*D. Reddick.*

1068. PETHYBRIDGE, GEORGE H. **Investigations on potato diseases. Ninth report.** Dept. Agric. and Tech. Instr. Ireland 18: ——. 1918.—Report of experiments carried on during summer of 1917. Burgundy mixture proved quite as efficacious as Bordeaux mixture in preventing late blight (*Phytophthora*). Spraying programs of two, three and four applications each, applied at suitable intervals, gave consecutively better results than that of a single application applied early in the season. One per cent bordeaux mixture cannot be recommended unreservedly even though, in many cases, it gives as good results as the two per cent.—The varieties tested for resistance to late blight were found to vary from highly resistant to susceptible. Clifton Seedling and Champion II proved strongly resistant; "*K*" Seedling, Shamrock and Northern Invincible are recorded as resistant. Great Scot, Dominion, Burnhouse Beauty, Provost and Kerr's Pink which are immune to black scab (*Chrysophlyctis*) were found by no means to be immune to late blight, pink rot (*P. erythroseptica*) or corky scab (*Spongospora*).—*Charles R. Stevenson.*

1069. RAMIREZ, ROMÁN. **Enfermedades del camote. [Diseases of the sweet potato.]** Rev. Agric. [Mexico] 2: 344. 1918.—In March of 1918 there appeared in Lower California for the first time a serious disease of the sweet potato which caused the loss of the crop. There was a whitish streaking in the tender potato and an ooze to which the dirt adhered. Fungous hyphae were found but no fruiting bodies. The disease is attributed to *Oozonium omnivorum*.—*F. M. Blodgett.*

1070. Ramirez, Román. **Manifestation rara en una cebolla. [A rare affection of an onion.]** Rev. Agric. [Mexico] 2: 34. *1 fig.* 1918.—An onion was found with the base of the leaves decayed and partially covered with a stiff whitish foam. A bacterium was found and partly described but inoculations resulted negatively.—*F. M. Blodgett.*

1071. Reddick, Donald. **Protecting the orchard by dusting.** Trans. Indiana Hortic. Soc. 1917: 126–139. 1918.

1072. Reddick, Donald. **Some essential facts about apple scab.** Trans. Indiana Hortic. Soc. 1917: 84–92. 1918.

1073. Ritzema Bos, J. **Ziekten bij kool. [Diseases of cabbage.]** Tijdschr. Plantenz. 24 (*Bijblad*): 26–35. *Fig. 1–3.* 1918.—Further information for growers in Holland, concerning the club root of cabbage, caused by *Plasmodiophora brassicae*.—*G. F. Puttick.*

1074. Sanders, G. E., and A. Kelsall. **Some miscellaneous observations on the origin and present use of some insecticides and fungicides.** Proc. Ent. Soc. Nova Scotia 1918: 69–75. 1919.

1075. Sanders, G. E., and A. Kelsall. **A copper dust.** Proc. Ent. Soc. Nova Scotia 1918: 32–37. 1919.—12.5 pounds of powdered, dehydrated copper sulfate ($CuSO_4$) was mixed with 80 pounds of dry, hydrated lime ($Ca(OH)_2$) and to this was added 7.5 pounds of dry arsenate of lime (40 per cent. As_2O_5). This provides for 5 per cent metallic copper and 2 per cent metallic arsenic and is referred to as 5: 2 copper arsenic dust.—Tests were made on potatoes using about 50 pounds of 5 : 2 dust per acre. The dust mixture gave as good or better results than liquid Bordeaux with an arsenical both in the control of late blight [*Phytophthora*] and of the potato beetle [*Phoradora*].—Tests on apples are inconclusive as to the fungicidal and insecticidal value of the mixture but no injury followed the use of a 5:2 dust mixture. —Data on the relative cost of material for dusting and for spraying as well as the relative cost of making the applications are included.—"The dust here described has proved promising in experiments and is worth further trial."—*D. Reddick.*

1076. Sanders, G. E., and W. H. Brittain. **A modified Bordeaux mixture for use in apple spraying.** Proc. Ent. Soc. Nova Scotia 1918: 51–61. 1919.—A short review of the chemistry of Bordeaux mixture and of injury to foliage from its use. Lime-sulfur solution applied with high pressure and greater capacity nozzles was found to cause such injury that it became necessary to find a harmless and efficient substitute. The authors give a preliminary report of their experiments with a Bordeaux containing a large excess of lime. Bordeaux of the standard formula was compared with 2 : 10 : 40 and 3 : 10 : 40 formulae. Where three parts of lime to one of copper sulfate was used the injury (yellowing of foliage and dropping of fruit) was reduced to a minimum. They conclude that it is unsafe to use less than three parts of lime to one of copper sulfate in making Bordeaux for repeated applications to the apple. There is indication that substituting "soluble sulfur" (1 pound to 40 gallons water) in the third spray will greatly reduce or entirely eliminate russeting of fruit. To this spray material should be added ¾ pound calcium arsenate (40 per cent. AS_2O_5) for biting insects and 5 pounds of hydrated lime to prevent injury from this arsenical. This excess-lime Bordeaux compares favorably with sulfid sprays in the control of apple scab even on the susceptible McIntosh variety. It is growing rapidly in favor in Nova Scotia and New Brunswick.—*L. R. Hesler.*

1077. Schoevers, T. A. C. **Iets over wortelknobbels en andere kankerachtige uitwassen bij planten. [Concerning root galls and other canker-like growths on plants.]** Tijdschr.

Plantenz. 24: 123–148. 1918.—The author discusses the symptoms, history and methods used in determining the cause of so-called crown-gall disease. Erwin F. Smith's researches on the disease are described in detail.—*G. F. Puttick.*

1078. South, F. W. **Buried coconut trunks and root diseases of rubber.** Agric. Bull. Fed. Malay States 6: 269–270. 1918.—Two root diseases of rubber trees caused by *Hymenochaete noxia* and *Poria hypolateritia* are attributed to the burying of coconut trunks in holes between the rows of rubber trees.—*J. Rosenbaum.*

1079. South, F. W. **Revised distribution of pink disease by mukims.** Agric. Bull. Fed. Malay States 6: 389–394. 1918.—It has been found that the river mukims are free from the pink disease.—*J. Rosenbaum.*

1080. Sprenger, A. M. **Gloeosporium lindemuthianum in princess-eboonen.** [G.l. on beans.] Tijdschr. Plantenz. 24 (Bijblad): 20. 1918.—In controlling the disease, it is emphasized that elimination of diseased seed does not always produce the result desired, for practical reasons. Hence, the necessity of using formalin treatment also. It is suggested also that infection may take place through spores in the soil or from neighboring infested fields.—*G. F. Puttick.*

1081. Stakman, E. C., and M. N. Levine. **Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis.** Jour. Agric. Res. 16: 43–77. 1919.—A study of the effect of hosts and of such factors as light, heat and humidity on the morphology of urediniospores.—It was determined that the amount of inoculum used has no perceptible effect on the result of infection or on the size of spores; that the optimum period of exposure to conditions favorable for infection is 48 hours; that the superficial layer in each uredinium contains spores of larger dimension than those beneath it; that in determining the size of spores measurement of 100 individuals from several uredinia gives accurate results and that in stating the size of spores the use of biometrical mode offers a practical basis for comparison.—The following biological forms of *Puccinia graminis* were investigated: *tritici*, *tritici-compacti*, *secalis*, *avenae*, *phleipratensis*, and *agrostis*. When grown on congenial hosts and under identical conditions it is found that urediniospores of these forms have a definite size, shape and color and it may be that they "represent incipient morphological species." The form *avenae* is an exception in so far as shape and size are concerned, these being very plastic.—Biologic forms are not unified by continued growth on common and congenial hosts, but on uncongenial hosts the size of uredinia and of spores is reduced.—If the host is supplied plentifully with water and light, optimum temperature for the development of the rust ranges between 66.5° and 70°. Above 70° the incubation is retarded 1 day for every 10° rise of temperature and below 66° it is retarded 1 day for every 5° fall.—The fungus attacked more severely plants grown in wet soil than those grown with a moderate amount or with very little water and the urediniospores are larger on such plants.—The fungus developed better on plants grown under fairly high light intensity than under a low one and the size of urediniospores was correspondingly larger.—The virulence of the parasite. and size of spores is not affected by the age of the host plant providing the host is healthy. Similarly, the length of association of a rust with its host (after the uredinium has burst until the formation of teliospores) does not impair the vitality of the fungus nor is the size of urediniospores in the next generation affected.—*D. Reddick.*

1082. Stakman, E. C., M. N. Levine, and J. G. Leach. **New biologic forms of Puccinia graminis.** Jour. Agric. Res. 16: 103–105. 1919.—About a dozen distinct forms are now known. The new forms have been tested on 25 strains and varieties of *Triticum aestivum*, *T. durum*, *T. compactum*, *T. dicoccum* and *T. moncoccum* as differential hosts. Only one variety, Khalpi, an emmer originally imported from India, is not susceptible to some one or more of the known strains of the fungus.—The discovery of these new forms is an added reason for eradicating the rust-susceptible varieties of barberry (*Berberis*) as a means of rust control in northern U. S. A. It also explains why a variety of wheat may be immune in one section and not in another and makes questionable the advisability of attempting to develop rust resistant wheats until more is known about the specialization of parasites.—*D. Reddick.*

1083. Stevenson, John A. **Cuarentena de plantas. [Quarantine of plants.]** Rev. Agric. Puerto Rico 1: 176–180. 1918.—Reasons why a plant quarantine is necessary are given with examples cited of diseases and insects that have caused serious losses when introduced into various countries and examples of diseases that have not yet reached Porto Rico.—*F. M. Blodgett.*

1084. Stevenson, John A. **La enfermedad de las raices de la caña. [The disease of sugar cane roots.]** Rev. Agric. Puerto Rico 1: 269–279. *Figs. 50–52.* 1918.—This title is used to include root rots caused by *Marasmius sacchari*, *Himantia stellifera*, *Odontia saccharicola* and other fungi not named. Losses from root-rots are general all over the island and range from negligible amounts to 50 per cent of the crop. Preventive measures are discussed including resistant varieties, care in obtaining seed pieces, good methods of culture and rotation of crops.—*F. M. Blodgett.*

1085. Stevenson, John A. **Marchitez y falta de desarrollo en las plantaciones de cacao de la Republica Dominicana. [Poor condition of cacao in Santo Domingo.]** Rev. Agric. Santo Domingo 14: 265–273. 1918.—During a trip of several weeks in Santo Domingo the author found cacao plantations were in poor condition. The usual diseases of cacao were not found to be so destructive as were poor conditions of planting, cultivating and fertilizing which lead to a weak condition of the trees and attacks by wound parasites.—*F. M. Blodgett.*

1086. Stevenson, John A. **La enfermedad nueva de la caña. [A new disease of sugar cane.]** Rev. Agric. Puerto Rico 1: 18–25. *Fig. 1–2.* 1918.—A new sugar cane disease is described which has rapidly spread to most of the cane growing regions on the north and south sides of the island. This disease named "matizada" or mosaic produces light yellowish stripes with irregular margins in the cane leaves, dwarfs the plant, causes the stalks to shrivel and in extreme cases to canker. It is carried by pieces of stalk from diseased plants when used in planting new fields. It appears to be a typical mosaic disease as no fungi, insects, fertilizers or soil conditions were found to cause the disease. Means of spread other than use of diseased stalks in planting have not been determined. Work aimed at securing resistant varieties has been undertaken with good prospects.—*F. M. Blodgett.*

1087. Stevenson, John A. **Cuarentena de plantas en Puerto Rico. [Quarantine of plants in Porto Rico.]** Rev. Agric. Puerto Rico 1: 213–216. 1918.—In a short review of the quarantine law of Porto Rico, it is stated that the first law was passed in 1905, a new law was passed in 1910, added to in 1914 and amended in 1915. A summary is also given of the number of inspections made and the insects and diseases intercepted.—*F. M. Blodgett.*

1088. Stevenson, John A. **Catalogo de las enfermedades fungosas y no-parasiticas que atacan las plantas economicas de Puerto Rico. [Catalog of the fungous and non-parasitic diseases of cultivated plants in Porto Rico.]** Rev. Agric. Puerto Rico 2^1: 19–27. 1918. Same title. *Ibid.* 2^2: 23–33. 1919.—A list of the more important diseases of economic plants of Porto Rico arranged alphabetically by hosts with short descriptions of symptoms and methods of control.—*F. M. Blodgett.*

1089. Stevenson, John A. **La enfermedad del mosaico del tabaco. [Mosaic disease of tobacco.]** Rev. Agric. Puerto Rico 2^1: 39–44. 1918.—This disease is very common in Porto Rico. A review of the symptoms, cause and control is given.—*F. M. Blodgett.*

1090. Tisdale, W. H. **Physoderma disease of corn.** Jour. Agric. Res. 16: 137–154. *Pl. A–B* (*colored*) and *10–17.* 1919.—*Physoderma zeamaydis* on *Zea mays* has been present in the United States at least since 1912. Its known distribution is roughly the southeastern quarter of the States which include much of the corn belt of the Mississippi Valley. The region where the disease is of importance is the seven southeastern states. In occasional fields the loss on account of the disease has been as high as 6 to 10 per cent but in the infested area as a whole the damage has not been great.—All the varieties of maize seem to be equally susceptible to attack and teosinte (*Euchlaena mexicana*) is also affected.—Lesions occur on blades, sheath and culm and at first are very similar to those of rust caused by *P. sorghi*.—Recently matured sporangia germinate readily in a film of water if supplied abundantly with oxygen and if the temperature is kept between 23° and 30°. From 20 to 50 zoospores are formed. After 1 to 2 days the zoospores germinate by sending out very fine fibrous hyphae which penetrate the epidermal cells. Within two days penetration has been accomplished and large swollen fungous cells may be formed.—The organism seems to be an obligate parasite. Artificial inoculations in greenhouse and field resulted in infection, the incubation period being 10 days.—Sporangia are resistant to low temperature (−8°F.) and if kept moist retain their vitality over winter.—The fungus is disseminated by the wind and probably by other agencies, e.g., flowing water, insects and various animals.—No definite means of control is known but sanitation, rotation and disease resistant varieties offer possibilities.—*D. Reddick.*

1091. Van Hall, Constant Johan Jacob. **De bescherming der cultuurgewassen tegen nieuwe ziekten en plagen uit het buitenland. [Protection of cultivated plants against new diseases and enemies from foreign countries.]** Teysmannia 29: 62–95. 1918.

1092. Venkata Rao, M. K. **The pest act against koleroga and its application.** Mysore Agric. Calender 1919: 17–20. 1919.—Statement of the pest act of October, 1917 which compels owners of areca palm to spray their groves to control Koleroga or rot disease of the nuts caused by [*Phytophthora arecae*]. Enforcement of the act in one village comprising about 50 acres resulted in complete suppression of the disease.—*D. Reddick.*

1093. Vincens, F. **Quelques maladies des plantes cultivées au Pará, Brésil. [Some disease of the cultivated plants of Para, Brazil.]** Bull. Soc. Path. Veg. France 5: 45–55. *Fig. 1–5.* 1918.—Leaf burn of tobacco caused by *Cercospora nicotianae* is described and figured. Prompt and careful picking of the leaves and burning of the badly diseased ones is recommended to reduce loss. Leaf spot of rice caused by *Cercospora orizae* is described and figured but not considered serious. Red leaf spot of sugar-cane occurs but is negligible.—A disease of the branches of cacao caused by *Lasiodiplodia theobromae*, a witches'-broom of unknown cause, a leaf spot caused by *Phyllosticta theobromicola* n. sp. and a disease of young fruit of the same host due to *Gloesporium theobromicolum* n. sp. are described, and the fungi figured. A disease of the leaves of *Anacardium occidentale* caused by *Dendrodochium paraense* n. sp. is also described and figured.—*C. L. Shear.*

1094. Vincens, F. **Nécrose des feuilles de pin due au Pestalozzia truncata Leveillé. [Necrosis of pine leaves caused by Pestalozzia truncata.]** Bull. Soc.Path. Veg. France 5: 27–31. *3 figs.* 1918.—A necrosis of leaves of *Pinus sylvestris* beginning toward the upper end of the leaf and finally causing the death of the terminal part is described. Microscopic examination of the diseased tissue showed fungous hyphae present. The diseased leaves in moist chamber produced a *Pestalozzia*. This is referred to *P. truncata* Lev. and is believed to be the same as the later *P. hartigii* Tub., also found on pine. The parasitism of the *Pestalozzia* found and its causal relation to the necrosis is regarded as probable, though the few inoculation experiments made gave negative results.—*C. L. Shear.*

1095. Weir, James R. **Forest disease surveys.** U. S. Dept. Agric. Bull. 658. *23 p., 22 fig.* 1918.—Detailed methods, based on experience, are presented for conducting forest disease surveys in conjunction with timber-survey projects. Such surveys will furnish data of value in conducting future sales of the areas in question.—Maps indicating principal areas of infection can be compiled from survey data and are of value in the appraisal, marking and general administration of the area.—*D. Reddick.*

1096. Weir, James R., and Ernest E. Hubert. **A study of heart-rot in western hemlock.** U. S. Dept. Agric. Bull. 722. *37 p., 13 fig.* 1918.—Western hemlock (*Tsuga heterophylla*) is now coming into use but there is prejudice against it due primarily to susceptibility to heart rot and rapid deterioration after cutting.—*Echinodontium tinctorium* is the cause of practically all the heart rot in the Northwest. The fungus and stringy, brown, heart-rot it produces are described and illustrated in detail. The fungus enters mainly through branch stubs.—In general, the sites and associations of western hemlock are favorable to the development of decay, the moisture relation being of seemingly greatest importance. In addition, the absence of any great amount of resin, the tolerant habit of the species, the early and abundant formation of branch stubs and the large number of spores produced by the fungus, are likewise factors in the rapid and extensive development of decay.—The environmental factors of the river bottoms are more favorable to early and extensive decay than are those of the southwestern slopes.—Two means of control are suggested (1) a rigid sanitation clause in timber-sale contracts providing for destruction by fire of all infectious cull material including infected trees usually left standing, and (2) pathological surveys to determine proper cutting age of hemlock.—*D. Reddick.*

1097. Wennink, C. S. **De gevolgen der bladrolziekte bij aardappelen. [Control of leaf-roll of potatoes.]** Tijdschr. Plantenz. 24 (Bijblad): *1–4. Fig. 1–5.* 1918.—The author conducted an experiment over one season, the results of which substantiate the statement by Quanjer that potatoes free from the leaf-roll disease can be produced by careful seed selection and by growing on non-infested land.—*G. F. Puttick.*

1098. Wormald, H. **A withertip of plum trees.** Ann. Appl. Biol. 5: 28–59. *Pl. 7–9.* 1918.—Disease is characterized by wilting and death of the tips of young twigs, the infection originating in a leaf some distance back from the tip. *Monilia cinerea* develops in such leaves and twigs during the following autumn and spring. This organism in pure culture was used in inoculation experiments and its pathogenicity proved for plum flowers, and wounded fruits. In some instances cankers were formed about the base of the flowering spur. Infection did not occur on leaves nor on unwounded fruits. Apple flowers were artificially infected but in no instance did the fungus extend into the spurs.—This strain of the fungus does not differ morphologically from the one associated with blossom wilt of apples but they are regarded as biologic forms since they differ in their power of causing infection of apple and can be distinguished by cultural and biochemical means.—Destruction of diseased parts is recommended as a control measure.—*D. Reddick.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Henry Kraemer, *Editor*

1099. Anonymous. **Cinchona experiments in the Philippines.** Chem. and Druggist 91: 139. 1918.—Seed of *Cinchona Ledgeriana* has been sent from Madras to Luzon where an attempt at cinchona cultivation is to be inaugurated.—*E. N. Gathercoal.*

1100. Anonymous. **Dutch East Indian essential oils.** Chem. and Druggist 91: 6–7. 1918.—Cajuput oil, from the leaves of *Melaleuca Leucadendron*, is produced in about 500 distilleries in the Moluccas, mostly by natives in charge of Chinese. Adulteration with kerosene or benzene is not uncommon. The green color, so much desired, is heightened by placing strips of copper in the stills. In 1915, nearly 80,000 kilos were exported, 16,000 of which went to the United States, and 60,000 kilos are used locally in Java.—Citronella oil, from the cultivated grass, *Andropogon Nardus*, is distilled mostly in Java. 233,326 kilos were exported in 1915, 63,560 kilos coming to the United States while nearly 516,000 kilos were exported in 1917, the United States receiving 205,000 kilos.—Lemongrass oil, from *Cymbopogon citratus*, is produced in relatively small quantities, for in quality it cannot compete with the Cochin and Reunion lemongrass oils.—Cananga or ylang-ylang oil, from the fresh flowers of the tree, *Artabotrys odoratissima*, is produced from a large plantation on the island of Bantam, 350 kilos of flowers yield 1 kilo of oil. The quality is not as good as the Manila ylang-ylang oil.—Patchouli oil, from *Pogostemon Heyneanus,* is distilled to some extent on the east coast of Sumatra.—*E. N. Gathercoal.*

1101. ANONYMOUS. **Indian drug research.** Chem. and Druggist 91: 5. 1918.—By resolution before the Bombay Legislative Council steps have been taken to start a pharmacological laboratory or research institute in medicine for scientific experiment with and research into indigenous drugs. The Government encouraged the idea and established a strong committee to prepare a scheme for the development of the institute.—*E. N. Gathercoal.*

1102. ANONYMOUS. **Quinine in India.** Chem. and Druggist 91: 57. 1918.—India produced sufficient cinchona bark and quinine for her own needs until 1892. From 1892 to 1901 she produced about 250,000 pounds of bark annually and imported as much more. By 1910 the annual production had increased to 400,000 pounds of bark annually. In 1917-18, 55,000 pounds of quinine was produced at the Madras factory and the total production of bark exceeded 2,000,000 pounds. Government has secured a tract of 400 square miles in Burma for cinchona plantation. It now has 1188 acres in cinchona, occupied as follows: *Cinchona officinalis* 13,000 trees, *C. Ledgeriana* 876,000 trees, hybrids 610,000 trees. However, only 87,000 pounds of bark were harvested last year and it will be ten to fifteen years before the whole plantation comes into bearing. Eventually India can not only supply herself but the Empire with quinine.—*E. N. Gathercoal.*

1103. ANONYMOUS. **Quisqualis indica, a substitute for Santonica. Devenport.**—Schweiz. Apoth. Zeitg. 56: 522. 1918.—The plant which furnishes this substitute belongs to the Combretaceae and grows wild in the tropical regions of Asia, America, and Africa. Only the seeds are used in medicine. The best drug comes from the province of Szetchouan which furnishes it in large quantities. The seeds contain an active principle resembling santonin and possess anthelmintic properties. The maximum dose is 7.5 g. for adults.—*H. Kraemer.*

1104. DOMINGUEZ, J. A. **Cultivation of medicinal plants.** Semana Medica (Buenos Ayres), through Jour. Amer. Med. Assoc. 72: 461. 1919.—Dominguez, director of the Institute of Botany and Pharmacology of the University of Buenos Aires, replies to an inquiry from the government in regard to the feasibility of cultivating the cinchona in Argentina. He advises starting with the *C. succirubra* as the hardiest species. If this succeeds, then others could be tried. Near the equator a high altitude is desirable. In Java the official plantations are at 1230 to 2350 meters but some private plantations are as low as 550 meters. All known plantations are above this altitude except in Australia where, although at an altitude of only 33 meters, the bark has yielded 6.5 per cent of alkaloids. The *C. Calisaya* seems to do best at an altitude of 2000 meters. With higher altitudes the levorotatory alkaloids seem to increase while the proportion of dextrorotatory decreases. The cinchona plants can bear a temperature of 2°C. but at freezing point or below they are seriously injured, as also with very high temperatures. The admissible range is from 4 to 33°C. that is, a minimal average of 15° and a maximal average of 27°C. The rainfall has to be at least 1200 mm.; in the Java plantation the annual precipitation is 2300 to 4500 mm. with a maximal humidity of 96 per cent. There is no yield the first four years.—*Wm. B. Day.*

1105. EWING, C. O., AND E. E. STANFORD. **Botanicals of the Blue Ridge.** Jour. Amer. Pharm. Assoc. 1: 16-26. 1919.—This paper gives an account of a visit to the Blue Ridge region for the purpose of making a survey of the drug plants growing there and to make a special study of the conditions of the drug trade of this locality, the methods employed in the collection, drying, preservation and distribution. The effect of the past war and the future of this industry are also discussed.—The paper is characterized by the many items of interest concerning the drug collection in this vicinity as to the actual existing conditions. Illustrated with a series of snap shots of the native drug collectors, warehouses, etc.—*A. Hogstad, Jr.*

1106. Guérin, M. **Adulteration of Cretan dittany with Calamintha candidissima.** Rept. Pharm. 30: 49. 1919.—Cretan dittany (*Origanum dictamnus*), a Labiate plant, is little used in France and only occurs in the Codex in the formula for "baume de Fioravanti." This plant, a native of Crete, is official in the pharmacopoeias of Denmark, Spain, Mexico, and Sweden. It can no longer be procured in France, but there is found in commerce, under the same name, another plant of the same family, *Calamintha candidissima*, which grows in Algeria.—The Cretan dittany is characterized by reddish flower stalks, broadly ovate leaves, the lower being petiolate and the upper sessile, both covered with a dense whitish tomentum. The flowers form pedunculate spikes surrounded by almost glabrous reddish bracts, 7 to 9 mm. in length. Under a lens the leaves are seen to be covered with glandular hairs.—The Cretan dittany possesses an aromatic odor like that of thyme. It has an acrid pungent taste. The hairs which cover both surfaces of the leaves are long and easily detached by rubbing. The glandular hairs, abundant on the upper epidermis, are bicellular with an eight-celled head where the secretion accumulates under the much distended cuticle. These glands are accompanied by a large number of very small secreting hairs having a unicellular head.—*Calamintha candidissima*, the article which reaches France, consists of short branches and the leaves are whiter than those of Cretan dittany and the odor is less delicate. The hairs which cover the leaves are less easily rubbed off; they are multicellular like those of Cretan dittany, but are shorter and have thinner walls. Their ramifications are more numerous and more complex. The secreting hairs are of two kinds as in *Origanum dictamnus* but larger, especially on the ventral epidermal layer. The secreting head may contain as many as sixteen cells.—To sum up, the leaves of *Calamintha candidissima* are always whiter than those of Cretan dittany; they never have reddish bracts; their odor is less delicate.—*H. Kraemer.*

1107. Hamilton, H. C. **Digitalis leaves: effect on activity of temperature in drying.** Amer. Jour. Pharm. 3: 177–183. 1919.—The author first records the results of several workers in regard to the variability of digitalis leaves and their preparations. It is noted that the variations are as high as 400 to 500 per cent. Included with these results are brief descriptions of the methods adopted by the various workers for the drying, preservation and extraction of the digitalis leaves.

The author performed a series of experiments to demonstrate the correctness of the statement made in connection with the drying of digitalis submitted to the Medical Department of the Army, which was grown wild in Oregon, that unless the drying was accomplished in an oven at a temperature ranging from 75 to 90°, it was practically worthless.

The results of the experiments are as follows:—That oven drying has no advantage over a reasonably rapid air drying of digitalis leaves. That the drying causes a marked deterioration when conducted in an oven at a high temperature. That the fresh drug has greater toxicity than the dried drug. That no products more highly toxic than those present in the crude drug are developed during the process of drying.—Two series of tables in tabulated form of the assay results, obtained on the fresh drug, the oven dried and sun-air dried drug are given.—*A. Hogstad, Jr.*

1108. Holmes, E. M. **Note on Indian Belladonna.** Pharm. Jour. 102: 2. 1918.—On the cultivation, curing and packing of Indian belladonna, which is evidently identical with *Atropa Belladonna*. The fact that the plants are grown at a fairly high elevation, 6500 feet, and in rich virgin soil accounts for the high percentage of alkaloid.—*E. N. Gathercoal.*

1109. Holmes, E. M. **Strophanthus Semina, B. P.** Pharm. Jour. 102: 33–34. 1918.—It is pointed out that for some years past it has been impossible to obtain pure seed of *S. Kombe* in commerce. Dealers object to importing strophanthus seed in their pods because of the increased cost of freight and handling and as the seeds of *S. Kombe* are not distinguishable with the naked eye from the seeds of numerous other species of S. of unknown value, seeds of lower price are sold as genuine Kombe seed or are admixed with just enough Kombe seed to "swear by." The danger of this carelessness about one of the most valuable heart remedies, when given in proper dose, but which is a dangerous heart poison in too large a dose, is leading to results that may easily prove disastrous. In view of the limited geographical range of *S. Kombe*, the use of *S. hispidus* which is the only other known species which gives the green reaction for strophanthin and which has a much wider range, might be ordered, as was done in the 9th revision of the U. S. P.—*E. N. Gathercoal.*

1110. JAVA CINCHONA COMPANIES. **Report of West Java Cinchona Planting Co.** Chem. and Druggist 91: 50. 1918.—Cinchona bark production in Java was not as good in 1917 as in 1916. The temperature was unfavorable and fungoid diseases caused much trouble. The quinine content dropped from an average of 7.14 to 6.7 per cent genuine sulphate; also the price was lower—10.574 cents against 11.366 cents in 1916. The sales of cinchona bark in Amsterdam were 7,893,362 kilos in 1916 and 5,821,250 kilos in 1917, while the year end stocks were reduced from 47,000 bales to 1384 bales. Quinine manufacture in Java has much increased. An editorial (Chem. and Druggist 91: 53. 1918) states that for the period 1910–1913 the world's production of cinchona bark was 25,225,000 pounds per annum, of which nearly 23,000,000 pounds is credited to Java, 2,000,000 to India and Ceylon and less than 500,000 to other countries.—*E. N. Gathercoal.*

1111. MENDIOLA, N. B. **A study of Philippine bast fibers.** Philippine Agric. and Forester 6 (1917): 6–39. *4 pl.*—Botanical studies of *Abroma angusta*, *Kleinhofia hospita*, *Melochia umbellata*, *Urena lobata*, *Hibiscus sabdariffa*, *Malachra fasciata*, *M. capitata*, *Triumfetta bartramia*, *Grewia multiflora*, and *Wikstroemia ovata;* microscopic studies of the structure of the fibers; and observations on their dimensions and tensile strength, the effect of seasonal rettings, and the commercial value of the various fibers have led to the conclusion that the fiber of *P. arborescens* cannot be extracted by water-retting, that *S. grandiflora* is not a textile fiber, and that none of the species studied can be profitably grown under the labor conditions and methods of manufacture prevailing in the Philippines at the present time. [Abst. in: Exp. Sta. Rec. 8: 739. 1918.]—*A. Hogstad, Jr.*

1112. TSCHIRCH, A., AND F. WOLTER. **Determination of the chemical value of digitalis.** Schweiz. Apoth. Zeitg., 56. 470–474, 495–498, 512–514. 1918.—The authors have experimented with four species of digitalis leaves. Their results show that the best methods of extraction is that of Reed-Vanderkleed but that it requires much time, 6 days. For solvents they used ether, acetic ether, absolute alcohol, amyl alcohol, benzene, carbon tetrachloride, chloroform, and acetone. Chloroform dissolves only part of the active substances contained in the drug; with absolute alcohol all of the active substances pass into the extract; benzene does not dissolve all of them; acetone is the best solvent for determining the chemical value of digitalis.—The authors employed a modified method of Keller, the leaves of the digitalis being first subjected for extraction by ether in order to remove the oils and chlorophyl. After removing the ether by distillation, the leaves were extracted with absolute alcohol. After purification with lead, the entire glucosides were isolated by acetone, the acetone being separated from the liquid by the addition of sodium chloride.—In this manner they obtained a complete exhaustion of the drug and the extract thus obtained has been called pandigiton and is said to possess all the physiological properties of digitalis. *H. Kraemer.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

GENERAL

1113. SCHMIDT, C. L. A., AND D. R. HOAGLAND. **Table of P_H, H^+ and OH^- values corresponding to electromotive forces determined in hydrogen electrode measurements, with a bibliography.**—Univ. California Publ. Physiol. 5: 23–69. 1919.—An extensive set of tables with a bibliography of 467 titles and notes upon the technique of making electrometric determinations of hydrogen or hydroxyl ion concentrations. The tables give the required equivalent of the potential of either the normal or tenth-normal KCl-calomel electrode and cover a range of P_H values from 0.034 to 14.032. Values are calculated on the temperature basis of 25°C. and a table of factors is given for converting readings made between 18° and 30°C. The bibliography gives a list of works dealing with the theory and use of the methods and with their applications to various types of investigation. The notes describe the basis upon which the computations were made and discuss certain important questions in technique.—*H. S. Reed.*

PROTOPLASM, MOTILITY

1114. Levi, Guiseppe. **Considerazioni sulla costituzione fisica del citoplasma desunte da nuovi dati morfologici sulle cellule coltivate in vitro. [Cells cultivated in vitro and the physical constitution of protoplasm.]** Atti R. Accad. Lincei, Rend. V, Cl. Sci. Fis., Mat. e Nat. 27^2: 136–140. 1918.

DIFFUSION, PERMEABILITY

1115. Harris, J. Arthur. **On the osmotic concentration of the tissue fluids of Phanerogamic epiphytes.** Amer. Jour. Bot. 5: 490–506. 1918.—The osmotic concentration of the tissue fluids of various epiphytes is much lower than that of terrestrial vegetation and the osmotic concentration of the species of epiphytes of Jamaica is much lower than those of Florida. [See Bot. Absts. 1, Entry 829.]—*R. W. Webb.*

MINERAL NUTRIENTS

1116. Shive, John W., and William H. Martin. **A comparison of salt requirements for young and for mature buckwheat plants in water cultures and sand cultures.** Amer. Jour. Bot. 5: 186–191. 1918.—Employing the usual methods, the authors conclude that the salt proportions producing the best physiological balance differ in the young and mature stages, and differ also as between water and sand cultures.—*R. W. Webb.*

1117. Toole, E. H., and W. E. Tottingham. **The influence of certain added solids upon the composition and efficiency of Knop's nutrient solution.** Amer. Jour. Bot. 5: 452–461. 1918.—The weight of dry barley tops was increased by the addition of $Fe(OH)_3$ to the solution, depressed by carbon black, and unaffected by $H_2S_2O_3$, whereas the weight and length of roots were little affected in each case. The growing plants exerted a neutralizing effect on the solutions and the weights of dry tops were inversely proportional to the hydrogen-ion concentrations. The higher application of $Fe(OH)_3$ removed much of the phosphorus of the solution, but yielded the best culture in yield and appearance.—*R. W. Webb.*

1118. True, Rodney H., Otis F. Black, and James W. Kelly. **Ash absorption by spinach from concentrated soil solutions.** Jour. Agric. Res. 16: 15–25. 1919.—Heavy application of mineral fertilizers as single salts and in complete mixtures were made on beds of spinach (*Spinacia oleracea*) at the Virginia Experiment Station. The best growth resulted when the basic complete mixture was used ($NaNO_3$, K_2SO_4, basic slag, dried blood, tankage). Growth was fair with acid phosphate or Na_2SO_4, poor with heavy applications of NaCl, $NaNO_3$ or acid complete mixture ($(NH_4)_2SO_4$, acid phosphate, KCl, dried blood, tankage), and poorest with KCl. There was no relation between ash content and growth as the plants showing best and poorest growths, with basic mixture and KCl respectively had the lowest ash contents. The highest total ash in the tops occurred when fertilized with NaCl, manure, $CaCO_3$, and acid phosphate, the lowest with KCl and basic mixture. For the roots the highest ash occurred with acid phosphate and manure, the lowest with KCl and NaCl. The amounts present of the Si, K, and Na showed wide fluctuation under different fertilizer treatments, the other element showed little variation. Relative to dry weights, manganese was the only element regularly present in greater quantities in the roots than in the tops. Magnesium was always present in greater quantities than calcium in both roots and tops except when the plants were fertilized with $CaCO_3$.—*Otis F. Curtis.*

PHOTOSYNTHESIS

1119. OSTERHOUT, W. J. V. **A simple method of demonstrating the production of aldehyde by chlorophyll and by aniline dyes in the presence of sunlight.** Amer. Jour. Bot. 5: 511–513. 1918.—A method for obtaining aldehyde from chlorophyll in sunlight is described. Aldehyde is also observed when aniline dyes are substituted for chlorophyll. From his experiments, the author believes that the aldehyde is formed by the decomposition of chlorophyll rather than by the decomposition of CO_2.—*R. W. Webb.*

METABOLISM (GENERAL)

1120. APPLEMAN, CHARLES O. **Special growth-promoting substances and correlation.** Science 48: 319–320. 1918.—The author concludes that the potato tuber contains a limited amount of a special growth-promoting substance, and that weak, slender sprouts result from a deficiency of this material. [See Bot. Absts. 1, Entry 283.]—*R. W. Webb.*

1121. DENIS, MARCEL. **Sur quelques thalles d'Aneura dépourvus de chlorophylle. [Concerning certain thalli of Aneura devoid of chlorophyll.]** Compt. Rend. Acad. Sci. Paris 168: 64–66. *Fig. 1–2.* 1919.—See Bot. Absts. 2, Entry 982.

1122. MARSH, C. DWIGHT, AND A. B. CLAWSON. **Stagger grass (Chrosperma muscaetoxicum) as a poisonous plant.** U. S. Dept. Agric. Bull. 710. *15 p., fig. 1–8.* 1918.—That stagger grass contains a substance very toxic to animals is confirmed by experiments with cattle and sheep.—*R. W. Webb.*

1123. POTTER, R. S., AND R. S. SNYDER. **The organic phosphorus of soil.** Soil Science 6: 321–332. *Fig. 1–2.* 1918.—The organic phosphorus of the soil is studied, particular attention being devoted to its distribution, nature, and acid hydrolysis. The authors conclude that organic phosphorus is not due to colloidal clay, and that the increase of phosphorus in the acid-extracted soil over the non-extracted soil is not due to increased solubility of phytin, inasmuch as phytin is extracted to a negligible extent with 1 per cent hydrochloric acid.—*R. W. Webb.*

1124. SWANSON, C. O., AND E. L. TAGUE. **Determination of acidity and titratable nitrogen in wheat with the hydrogen electrode.** Jour. Agric. Res. 16: 1–13. 1919.—The hydrogen ion concentrations in the extracts of ground wheat were determined by means of the hydrogen electrode. The substances produced when wheat is digested in water are not ionized until an alkali has been added. The amount of these substances produced, up to a certain limit, bears a definite relation to the time and temperature used in the digestion.—*Henry Schmitz.*

METABOLISM, RESPIRATION

1125. APPLEMAN, CHARLES O. **Respiration and catalase activity in sweet corn.** Amer. Jour. Bot. 5: 207–209. *Fig. 1.* 1918.—Respiration in sweet corn in the milk stage is very high when the corn is pulled, but decreases rapidly with storage. The author finds that catalase activity shows a corresponding decline with storage which is almost directly proportional to the decline of respiration. Potato tubers exhibit a similar relation.—*R. W. Webb.*

ORGANISM AS A WHOLE

1126. DANIEL, LUCIEN. **Cultures maraîchères expérimentales au bord de la mer. [Market gardening experiments on the sea coast.]** Compt. Rend. Acad. Sci. Paris 168: 116–118. 1919.—See Bot. Absts. 3, Entry 80.

1127. GREAVES, J. E. **Azofication.** Soil Science 6: 163–217. *Fig. 1–2.* 1918.—The morphology and physiology of *Azotobacter* are extensively studied under the influence of various factors, and the experimental data show the important part that *Azotobacter* plays in maintaining the nitrogen balance of the soil.—*R. W. Webb.*

1128. Osterhout, W. J. V. **Endurance of extreme conditions and its relation to the theory of adaptation.** Amer. Jour. Bot. 5: 507–510. *Fig. 1.* 1918.—From the fact that a species of *Tradescantia* lived for two years without soil or water, then grew vigorously on being placed in a saturated atmosphere, and finally grew slightly on being submerged, the author concludes that the explanation of this case, as well as of others must be based on physical or chemical conditions of the protoplasm without reference to direct adaptation.—*R. W. Webb.*

1129. Stakman, E. C., and M. N. Levine. **Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis.** Jour. Agric. Res. 16: 43–47. 1919.—See Bot. Absts. 2, Entry 1081.

1130. Williams, Katherine A. **A botanical study of skunk-cabbage, Symplocarpus foetidus.** Torreya 19: 21–29. *Pl. 1–2, fig. 1–13.* 1919.—See Bot. Absts. 2, Entry 981.

GROWTH, DEVELOPMENT, REPRODUCTION

1131. Appleman, C. O. **Physiological basis for the preparation of potatoes for seed.** Maryland Agric. Exp. Sta. Bull. 212: 80–102. *Fig. 1–11.* 1918.—The author extensively studies the production and growth of sprouts on the potato tuber, as influenced by various factors, concluding that internal inhibitory influences play an important rôle in this phenomenon. He suggests certain principles to be adhered to in the preparation of seed for the practical growing of potatoes.—*R. W. Webb.*

GERMINATION, RENEWAL OF ACTIVITY

1132. Andrews, F. M., and C. C. Beals. **The effect of soaking in water and of aeration on the growth of Zea Mays.** Bull. Torrey Bot. Club 46: 91–100. *Fig. 1–5.* 1919.—Experiments were conducted to ascertain the proper length of time to soak the grains for maximum growth; 12 hours was the optimum. A study was also made of the results of puncturing the grains before soaking and of the effect of punctures in different parts of the grain; under proper conditions puncturing accelerates growth. Plants grown in water cultures that were aerated showed marked improvement over non-aerated, especially when the temperature was kept at a low enough point.—*P. A. Munz.*

REGENERATION

1133. Reed, H. S., and F. F. Halma. **On the existence of a growth inhibiting substance in the Chinese lemon.** Univ. California Publ. Agric. Sci. 4: 99–112. *Pl. 3–6.* 1919.—Discussion of a hypothetical growth inhibiting substance in the Chinese lemon, and of its effects upon the development of new shoots on cuttings. The theory is advanced that the shoots developing nearest the apex form a substance which is capable of inhibiting the growth of subapical buds on the vertical stem. The dominant influence of the apical buds may be prevented from reaching lower buds by notching the phloem layer just above each bud. When the upper part of the cuttings was enclosed in a plaster cast, the development of buds on that portion was prevented, but lower buds developed. After removal of the casts the apical buds grew and showed an inhibitory action on the growth of the lower shoots previously produced.—Horizontal branches or cuttings produced shoots only from the upper side. Rotation of such a cutting after shoots have appeared on the dorsal side permits new shoots to appear on what was previously the ventral side of the cutting. In horizontally placed shoots the inhibiting substance appears to settle to the ventral side of the shoot.—*H. S. Reed.*

TEMPERATURE RELATIONS

1134. Ellenberger, H. B. **A study of bacteria in ice cream during storage.** Cornell Univ. Agric.Exp.Sta.Mem. 18: 331-361. 1919.—Plate counts of ice cream, made immediately after the ice cream was frozen, show a higher bacterial count than the ice cream mixture before freezing. This is probably due to the breaking up of clumps of organisms. There is no very radical change in number of bacteria with storage. There is a slight decrease the first few days followed by slight increase up to about the tenth day and then a gradual decrease until at the end of 90 days only 30 per cent of the original number remain. Agar plates gave higher counts than gelatine plates and the addition of litmus to the media decreased the total number of bacteria.—*L. Knudson.*

1135. PANTANELLI, E. **Sul la resistenza delle piante al freddo.** [On the resistance of plants to cold.] Atti R. Accad. Lincei, Cl. Sci. Fis., Mat. e Nat., Rend. V, 27^1: 126–130, 148–153. 1918.—Pot experiments with nutrient solutions were made with grain, beets, sunflowers, tomatoes and maize.—The removal of heat through the lowering of temperature is the essential cause of death from cold and to this is opposed the resistance of the organs, while the formation of ice is an accessory process. The resistance to freezing is not related to the concentration of the cell sap, nor to its acid or salt content, but to the proportion of sugar that the cells succeed in conserving during the cooling.—*F. M. Blodgett.*

TOXIC AGENTS

1136. DEATRICK, E. P. **The effect of manganese compounds on soils and plants.** Cornell Univ. Agric. Exp. Sta. Mem. 19: 371–402. 1919.—Wheat grown in distilled water containing 20 parts per million of manganese, as manganese sulfate, showed injury, particularly in growth of roots. In a nutrient solution, distinct stimulation of growth was noted with manganese sulfate at a concentration of manganese as high as 400 parts per million. At 10 parts per million the increase was 100 per cent. Manganese chloride and manganese carbonate gave like results. In soil culture (Dunkirk clay loam), wheat grown 7½ months showed a decided increase in yield of grain with 10 or 25 parts per million of manganese. The addition of calcium carbonate along with manganese sulfate seems to delay the heading of wheat. Leaves injured by manganese show relatively high manganese content. Manganese increases oxidizing power of the soil.—*L. Knudson.*

1137. HARTWELL, BURT L., AND F. R. PEMBER. **The presence of aluminum as a reason for the difference in the effect of so-called acid soil on barley and rye.** Soil Science 6: 259–279. *Pl. 1; fig. 1-2.* 1918.—With rye and barley plants as indicators, the active factor for the different influence on plants in acid soils proved to be aluminum, and the results indicate that phosphating and liming acid soils may be advantageous in precipitating aluminum, as well as acting as a nutrient and a reducer of acidity.—*R. W. Webb.*

1138. LIPMAN, C. B., AND W. F. GERICKE. **Copper and zinc as antagonistic agents to the "alkali" salts in soils.** Amer. Jour. Bot. 5: 151–170. *Fig. 1-2.* 1918.—The data obtained from experiments using Berkeley adobe soil or Oakley sand support the view that the heavy metals exert an antagonistic action to alkali salts for crop plants grown in pots and it is implied that the phenomenon may be of great practical importance.—*R. W. Webb.*

1139. LUDWIG, C. A. **The influence of illuminating gas and its constituents on certain bacteria and fungi.** Amer. Jour. Bot. 5: 1–31. 1918.—Various bacteria and fungi fail to exhibit any marked sensitiveness to small amounts of illuminating gas or its constituents, the relatively slight action observed depending on the specific organism and the constituents concerned. The effect of the illuminating gas is considered to be due to the sum of the effects of the constituents and to the deficiency of oxygen. No organism acquired a tolerance to the various gases, but, on the other hand, showed a slight but gradual decline in vigor.—*R. W. Webb.*

1140. LUDWIG, C. A. **The effect of tobacco smoke and of methyl iodide vapor on the growth of certain organisms.** Amer. Jour. Bot. 5: 171–177. 1918.—Tobacco smoke appears to be more or less toxic to all the organisms studied—unwashed smoke being more toxic than washed smoke. Methyl-iodide vapor induces a great retardation at first followed by a vigorous growth unless the vapor is of such concentration as to sterilize.—*R. W. Webb.*

1141. Lund, Barbara Lee. **The toxic action of KCN and its relation to the state of nutrition and age of the cell as shown by Paramecium and Didinium.** Marine Biol. Bull. 35: 211–231. *Fig. 1–3.* 1918.

MISCELLANEOUS

1142. Anonymous. **Outlook for kelp products.** Pacific Fisherman 17^1: 46. 1919.—Note on alginic acid.—*T. C. Frye.*

1143. Brooks, Charles, J. C. Cooley, and D. F. Fisher. **Apple scald.** Jour. Agric. Res. 16: 195–217. *Fig. 1–11.* 1919.—Apple scald is due to the long continued action of more or less abnormal storage conditions, conditions that cause the production or prevent the elimination of certain waste products. Most varieties of apples may be exposed to unfavorable conditions for several weeks without developing scald and without showing any tendency to the disease if later stored under nearly normal conditions, but they finally reach a certain critical period at which time they are not scalded, yet have developed a tendency to scald that can not be radicated by removing the agencies that were originally responsible for the trouble.—Apple scald is due to volatile or gaseous substances other than carbon dioxid that are produced in the metabolism of the apple. They can be carried away by air currents or taken away by various absorbents, such as excelsior, sawdust, animal charcoal and by wrappers impregnated with various fats. A constant air movement of from 0.12 to 0.25 mile per hour has always either entirely prevented apple scald or has reduced it to a negligible quantity. The intensity of air movement apparently is more important than the continuity, and circulation of air more important than air renewal. Previous work by the authors is summarized, and additional data bearing on certain phases of the question are included.—*D. Reddick.*

1144. Shreve, Edith Bellamy. **The imbibition of water by gelatine.** Science 48: 324–327. 1918.—This work emphasizes the fact that, when studying the absorption of water by gelatine and other colloidal jellies, the identical history of water content and of water-loss must be carefully considered, also that the greatest shrinking and swelling take place along the axis which is perpendicular to the largest evaporating surface.—*R. W. Webb.*

1145. Waksman, Selman A. **The occurrence of Azotobacter in cranberry soils.** Science 48: 653–654. 1918.—*Azotobacter* and *Actinomyces* filaments are found in the soil from a cranberry bog that has previously been limed, but are absent from similar soil that has not been limed. A hydrogen-ion determination is made with each soil extract with the following results: limed, PH 6.2–6.4; unlimed, PH 5.4–5.6. The results show that a greatly increased crop production can be obtained by simply changing the reaction of such soils so as to be favorable to the growth of *Azotobacter.*—*R. W. Webb.*

SOIL SCIENCE

J. J. Skinner, *Editor*

1146. McMurran, S. M. **Pecan rosette in relation to soil deficiencies.** U. S. Dept. Agric. Bull. 756. *11 p., figs. 1–4.* 1919.—The relation of the rosetting of pecans to soil deficiencies is pointed out. On the river flood plain soils of Louisiana, where the soil is deep and black, of high fertility and water holding capacity the disease is almost unknown. Its occurrence is most prevalent on the unproductive, deep sand and sandy clay soils of the Atlantic and Gulf Coastal plains. It is not found on the fertile soils containing large amounts of organic matter of this region. Experiments showed that the liming of soils did not prevent rosetting, nor was there any relation between acid soils and the rosetting of pecans. Stable manure incorporated in the soil prevented the disease to a large extent. The growing of leguminous crops in the orchard for the purpose of green manuring is recommended.—*J. J. Skinner.*

1147. Noyes, H. A., and S. D. Connor. **Nitrates, nitrification and bacterial contents of five typical acid soils as affected by lime, fertilizer, crops and moisture.** Jour. Agric. Res. 16: 27–42. *Pl. 1–9.* 1919.—The paper presents results of investigations taking into consideration both the nitrates and bacterial numbers, as well as a correlation of these two, under certain specific conditions.—The data were secured from fine soil samples which were kept under controlled conditions. The soils were all very acid and varied widely in organic matter. Applications of calcium carbonate, 2 to 4 tons per acre, increased nitrate accumulation and gave higher bacterial counts. Other fertilizers were less regular in their effect.—The soils, when fully saturated with water and incubated with ammonium sulphate, did not accumulate nitrates, when one-fourth and one-half saturated they showed considerable increase in nitrate content. Increased moisture content tended to increase aerobic and anaerobic counts.—Bacterial counts are correlated with nitrate accumulation.—*J. K. Wilson.*

1148. Wright, R. C. **Nitrogen relations of certain crop plants when grown alone and in association.** Jour. Amer. Soc. Agron. 11: 49–66. 1919.—In a study made of the behavior of representative field crops grown alone and in combination with other crops, the non-legumes, barley, rye, oats, and kafir were each grown in the same soil with one of the legumes, vetch, field peas and red clover; corn was also grown with oats and millet. The soil used in the experiments was contained in large galvanized iron buckets holding 45 grams of moist soil. When 2 species of plants were grown in association, half the number of plants of each were used as when grown alone. Crops were grown to maturity and harvested close to the surface of the soil. When account was taken of the nitrogen occurring in the soil and in the plant after harvesting, it was found that there was a distinct loss of nitrogen when barley was grown with peas, rye with peas or clover, and corn with millet. There was a gain in nitrogen when barley was grown with vetch or clover, oats with peas or clover, and kafir with vetch. In general, when barley and vetch or clover, oats and vetch or peas, and kafir and vetch were grown together, although more dry matter and nitrogen were produced, not so much nitrogen was removed from the soil as when these crops were grown alone. Oats and kafir gained in percentage of nitrogen when grown with vetch, peas or clover, and corn lost with both oats and millet. All other crops gained in percentage of nitrogen when grown with some crops and lost with others. Similar experiments were repeated the following season using 3 types of soil from the states of California, Kansas and Virginia. Oats, barley and kafir were used as the non-legumes, and soybeans and purple vetch as the legumes. For each of the combinations there was found to be a gain of nitrogen during the growth of the crop in one or more of the soils and a loss in the others. Oats and kafir when grown with vetch, and soybeans when grown with vetch, and soybeans when grown with oats or barley gained in percentage of nitrogen in all soils; while barley with soybeans, and vetch with barley or kafir lost in all soils.—*W. H. Ross.*

1149. Greaves, J. E., E. G. Carter, and N. C. Goldthorpe. **Influence of salts on the nitric-nitrogen accumulation in the soil.** Jour. Agric. Res. 16: 107–135. *5 fig.* 1919.—The toxicity of the chlorides, nitrates, sulphates and carbonates of Na, K, Ca, Mg, Mn, and Fe as determined by nitrification is influenced by the specific salt and not by electro-negative-ion. The quantity of a salt which can be used without decreasing nitrification varies with the salt. The order of decreasing toxicity of the salts on the acid sandy loam used was as follows: Na_2SO_4, Na_2CO_3, $CaCO_3$, K_2SO_4, K_2CO_3, $Fe(NO_3)_2$, $NaNO_3$, $MgSO_4$, $FeSO_4$, $Ca(NO_3)_2$, KNO_3, KCl, $Mg(NO_3)_2$, $Mn(NO_3)_2$, $FeCl_3$, $MgCO_3$, $NaCl$, $CaCl_2$, and $CaSO_4$. The toxicity of some salts increase more rapidly than others. The principal factor seems to be a physiological one due to the action of the substance on the living protoplasm of the cell. The common soil alkalies, $CaCl_2$, Na_2SO_4, Na_2CO_3, are very toxic to the nitrifying organisms, and when present in sufficient amounts greatly reduce the NO_3 accumulation in the soil. With the exception of Na_2SO_4, Na_2CO_3, $CaCO_3$, K_2SO_4, K_2CO_3 and $Fe(NO_3)_2$, the salts in some concentrations acted as stimulants of the nitrifying organisms. The compounds which are the strongest plant stimulants are the most efficient in increasing the nitric-nitrogen accumulation in the soil.—*J. J. Skinner.*

1150. AMES, J. W., AND T. E. RICHMOND. **Effect of sulfofication and nitrification on rock phosphate.** Soil Science 6: 351–364. 1918.—A study was made in different soils of the acidity produced by the sulfofication and nitrification of composts containing rock phosphate. In the sulfofication experiments, 2 grams of sulphur were added to 500 gram portions of the soil without and with varying amounts of $CaCO_3$ in order to study the effect of the processes in acid soils and in soils supplied with basic material. Oxidation of the sulphur was found to proceed rapidly in an acid soil, approximately 50 per cent being changed to the form of sulfate. $CaCO_3$ added to an acid soil depressed sulfofication, but in sand mixtures the presence of $CaCO_3$ was found to be essential. In the absence of other bases the Ca of rock phosphate did not serve as a base for the sulfofying process to any appreciable extent. When phosphate rock was added to an acid silt loam at the rate of 1900 parts per million, the oxidation of sulphur incorporated with the phosphate in the absence of $CaCO_3$, or nitrogen carriers, changed 630 parts of phosphorus into a form soluble in neutral ammonium citrate solution. In a basic soil, or when $CaCO_3$ was added to the mixture, the acidity resulting from sulfofication was neutralized by the Ca present as carbonate, and the solvent action on the phosphate was therefore much less than occurred in the acid soil. When sulphur and dried blood were added to an acid soil, the oxidation of the sulphur proceeded actively but nitrification in the absence of $CaCO_3$ was practically inhibited by the acidity resulting from the oxidation of the sulphur. The transition from proteid apparently ended with the formation of NH_3 which in turn reacted to neutralize the acidity arising from the sulfofying organisms. Nitrification is stimulated by rock phosphate to a very limited extent. It is not an active agent for increasing the solubility of rock phosphate when mixed with soil.—*W. H. Ross.*

1151. MCCOOL, M. M., AND C. E. MILLAR. **Some general information on lime and its uses and functions in soils.** Michigan Agric. Exp. Sta. Special Bull. 91. *11 p., fig. 1–9.* 1918. The general effect of lime on crops, the sources and the supply in Michigan is discussed. A list of legumes and non-legumes which respond to lime are given.—*J. J. Skinner.*

1152. NOYES, H. A. **The effect of heat on the lime requirements of soils.** Jour. Amer. Soc. Agron. 11: 70–71. 1919.—It is shown from examination of samples of soil collected at different depths and in different places that reactions take place in the soil at the temperature of the steam bath that do not take place when the soil and water mixture is not heated. It is held that the Veitch method which gives the reaction between soil, water and $Ca(OH)_2$ at steam bath temperature does not represent the lime requirement of the soil at ordinary temperatures.—*W. H. Ross.*

1153. DEATRICK, E. P. **The effect of manganese compounds on soils and plants.** Cornell Univ. Agric. Exp. Sta. Mem. 19: 371–402. 1919.—See Bot. Absts. 2, Entry 1136.

1154. TRUE, RODNEY H., OTIS F. BLACK, AND JAMES W. KELLY. **Ash absorption by spinach from concentrated soil solutions.** Jour. Agric. Res. 16: 15–25. 1919.—See Bot. Absts. 2, Entry 1118.

1155. SCHOLLENBERGER, C. J. **Organic phosphorus of soil: experimental work on methods for extraction and determination.** Soil Science 6: 365–395. 1918.—Detailed descriptions of several methods used in the study of the organic phosphorus of the soil is given. It is shown that as solvents for the organic phosphorus of the soil studied, solutions of the hydroxides of the fixed alkalies are not superior to NH_3. One extraction by NH_3 when carried out under the proper conditions was found to remove practically all the organic phosphorus from the soil that is capable of being taken into solution by NH_3. No consistent relations were observed in these solutions between the contents of NH_3 soluble organic matter (humus), humus ash, SiO_2, Fe_2O_3 and Al_2O_3; nor between the total organic matter and the organic phosphorus in NH_3-extracts prepared in various ways, although there was a general tendency for these to vary together. The most satisfactory method for separating clay from ammoniacal soil extracts, having in view the maximum content of organic phosphorus, was found to consist in filtering the extract through a layer of the soil itself supported by a flat paper filter on a Buchner funnel as described by MacIntire and Hardy (C. A. 9, 346). Evidence is presented that inorganic phosphorus absorbed by colloids, organic or inorganic, is not included in the apparent content of organic phosphorus as determined by the methods used. Determinations of humus, color and organic phosphorus in NH_3-extracts of 4 depths of the soil indicate that these NH_3-soluble constituents are present in about the same relative proportions in the 4 depths examined. The total nitrogen content of the same 4 depths of soil stand in ratios very similar to those exhibited by the NH_3-soluble constituents named.—*W. H. Ross.*

1156. HOPKINS, C. G., J. G. MOSIER, E. VAN ALSTINE, AND F. W. GARRETT. **Champaign County soils.** Illinois Agric. Exp. Sta. Soil Rept. 18. *61 pp., plate 1–14, 4 maps.* 1918.—A soil survey map of the county is given together with the results of chemical analyses and fertilizer experiments on the principal soil types. The soils are divided into 4 groups (a) upland prairie, (b) upland timber, (c) terrace, and (d) swamp and bottom land soils. The upland prairie soil comprise 92.2 per cent of the entire area. Upland timber soils 4.9 per cent, terrace soils 0.52 per cent and swamp soils 2.3 per cent. The upland prairie soils are higher in organic matter, and plant food elements than other soil classes except the swamp soils, which contain more organic matter. Field experiments show the soils to respond well to phosphorus when applied with nitrogen or with legumes. Manure, limestone and phosphorus produced large increased clover growth on the brown silt loam prairie soils.—*J. J. Skinner.*

1157. CLOUSTON, D. **Manures in their relation to soils and crop production in the central provinces.** Agric. Jour. India. 14: 101–6. 1919.—The 4 principal soils of the central provinces are described, i.e., the alluvial soils of the Nerbudda Valley, or wheat soils; the black cotton soils, and the lateritic and motamorphic rice soils. All of the soils are low in fertility and respond well to stock manure.—*J. J. Skinner.*

1158. DAVIS, W. **Present position and future prospects of the natural indigo industry. IV. The effect of superphosphate manuring on the yield and quality of the indigo plant.** Agric. Jour. India. 14: 21–41. 1919.—It is pointed out that the indigo industry in India is critical due to the impoverishment of the soil. Experiments conducted show that the soil is restored for indigo culture by use of phosphates. This fertilization also prevents the wilt. Stable manure and lime did not cause an increased production. The yield of indigo cake per plant is also increased by phosphate. Phosphate fertilization is concluded to be the best treatment for restoring soil for indigo culture.—*J. J. Skinner.*

1159. DANIEL, LUCIEN. **Cultures maraichères expérimentales au bord de la mer. [Market gardening experiments on the sea coast.]** Compt. Rend. Acad. Sci. Paris 168: 116–118. 1919.—See Bot. Absts. 3, Entry 80.

1160. LAPICQUE, L., AND E. BARBÉ. **Indice de chlore comme mesure comparative de la richesse des terres en humus. [Chlorine index as a measure of the comparative amount of humus in soils.]** Compt. Rend. Acad. Sci. Paris 168: 118–121. 1919.—A simple method is suggested by which indications of the amount of humus in soils may be obtained. It is believed that this method will be especially useful in studying the soils of devastated regions.—*V. H. Young.*

1161. BERTHELOT, DANIEL, AND RENÉ TRANNOY. **Sur le pouvoir absorbant de la terre sèche ou humide vis-à-vis du chlore gazeux. [Concerning the absorbing power of soils in contact with chlorine gas.]** Compt. Rend. Acad. Sci. Paris 168: 121–123. 1919.—The chlorine absorbing power of different types of soil with varying amounts of moisture is determined.—*V. H. Young.*

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ENTRIES 1162-1371

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

1162. Richardson, A. E. V. **Agriculture. America and Australia compared.** Jour. Dept. Agric. Victoria 17: 1-20. 1919.—See Bot. Absts. 3, Entry 162.

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

1163. Anonymous. **The forestry situation in New South Wales.** Amer. Forestry 25: 862-863. 1919.

1164. Anonymous. **Note on Corypha palm in North Kanara.** Indian Forester 44: 509-510. Nov., 1918.—The character of the forests in which the corypha palm (sp?) is described, with the character of its reproduction power and longevity. The pith found in mature trees is of great value for flour. Leaves are used for umbrellas and the seeds for ornaments.—*E. N. Munns.*

1165. Anonymous. **Manitoba 75 per cent under forest.** Canadian Forestry Jour. 14: 13-15. Jan., 1919.—About 75 per cent of Manitoba is forested, the forests extending northward till the "barren lands" are reached. White spruce is the only species of much value, growing to 36 inches in diameter and 90 feet in height. Fire has caused much damage and many regions have not reforested. The annual cut is around 15 million board feet. Pulpwood offers great possibilities and peat may be secured. The possibility of securing a steady revenue from the forest is discussed together with Sweden's example in forest practices under similar climatic conditions.—*E. N. Munns.*

1166. Besley, F. W. **Forest opportunity on pine lands in the South.** Amer. Forestry 25: 983-984. 1919.

1167. Blanford, H. R. **Note on operations in bamboo flowered areas.** Indian Forester 44: 550-559. 1918.—Observations show that during the flowering of bamboo, teak can get well established and make good growth before being suppressed. Artificial regeneration at the time is also easy.—*E. N. Munns.*

1168. Chapman, Herman H. **Forests and floods in China.** Amer. Forestry 25: 835-843. *21 fig.* 1919.—The influence of forests upon stream flow is considered with special reference to conditions in China. The disastrous Chihli flood of 1917 caused great loss of life, made thousands of people homeless, destroyed houses and crops and greatly interfered with railway operation. The only practicable method of checking the floods is by reforestation of the denuded slopes. Without reforestation, the plains of China will continually be subject to floods of greater and greater severity. The need of China today is the creation of a national policy for reforesting the mountain slopes of northern China.—*Chas. H. Otis.*

1169. Clapp, Earle H. **Forest research—in the war and after.** Amer. Forestry 25: 947–950. *3 fig.* 1919.

1170. De, R. N. **Simul plantation in Jkums in Assam.** Indian Forester 44: 516–520. Nov., 1918.—The management of simul (*Bombax malabaricum*) is described. The tree requires 25 to 30 years to attain a 6 foot circumference, which is the best size for use in making tea boxes and for cold storage chests.—*E. N. Munns.*

1171. Fernow, B. E. **Why should a tree die?** Canadian Forestry Jour. 14: 1–11. Jan., 1919.—The dragon trees, a genus of the lily family, on the Teneriffe Island, many thousands years old, are 15 feet in diameter and 75 feet in height. The more rapid-growing Sequoias are much larger but only attain an age of 3,000 to 4,000 years at the most.—*E. N. Munns.*

1172. Fischer, C. E. C. **Cause of the spike disease of sandal.** Indian Forester 44: 570–575. 1918.—Observations on the disease are given, in connection with entomological work as a source of distribution of the disease.—*E. N. Munns.*

1173. Gaskill, Alfred. **Why wood is best.** Amer. Forestry 25: 991–994. *7 fig.* 1919.—*Popular.*

1174. Gibson, A. J. **The rosin and turpentine factory at Jallo, Punjab.** Indian Forester 44: 539–550. 1918.—A description of the operation and methods employed in a new still operated by the Forest Department is given.—*E. N. Munns.*

1175. Hole, R. S. **Notes from Dehra Dun Herbarium. Some Indian species of Zizyphus.** Indian Forester 44: 504–508. Nov., 1918.—A continuation of previous work. General descriptions and characteristics of the species of the genus are given, with notes and comments. —*E. N. Munns.*

1176. Howard, S. **Sal nurseries in Gorakhpur.** Indian Forester 44: 560–570. 1918.—Observations are given on three sal nurseries. It was found that the seedlings cannot stand transplanting unless with a ball of earth; working the soil is essential, no shade is needed for the young trees, and root and shoot cuttings are detrimental to the plant.—*E. N. Munns.*

1177. Lushington, P. M. **Progress of spike investigation.** Indian Forester 44: 439–460. Oct., 1918.—Results of the spike investigations in India appear to show that spike is a disease caused by microorganisms, infection being possible through animals, birds, insects and plants. The disease spreads more rapidly in seedlings that in trees, the spring months being most favorable. Incubation is uncertain and preventative measures so far have failed to stop the trouble. [See Bot. Absts. 2, Entries 1296, 1297, 1298, 1303, 1304, and 1307.]—*E. N. Munns.*

1178. Marsden, Edward. **Girth-increment of sal in regular crops in the United Provinces.** Indian Forester 44: 469–475. Oct., 1918.—The girth-increment of sal based on both total girth and on age is given and plotted on charts for different quality sites.—E. *N. Munns.*

1179. Maxwell, Hu. **The uses of wood. Wooden artificial limbs.** Amer. Forestry 25: 807–816. *16 fig.* 1919.

1180. MAXWELL, HU. **The uses of wood. Wood used in vehicle manufacture.** Amer. Forestry 25: 845–852. *14 fig.* 1919.

1181. MAXWELL, HU. **The uses of wood. Fencing materials from forests.** Amer. Forestry 25: 923–930. *18 fig.* 1919.

1182. MAXWELL, HU. **The uses of wood. Wooden boats and their manufacture.** Amer. Forestry 25: 973–983. *19 fig.* 1919.

1183. MELROSE, GEORGE P. **Coupling the forest to the fruit farm.** Canadian forestry Jour. 14: 8–11. Jan., 1919.—Irrigation interests of the Okanagan Valley require a steady water supply during the growing season, which is supplied by the forested mountains. General considerations of the effect of forests upon run-off and erosion are described.—*E. N. Munns.*

1184. NICHOLSON, J. W. **Mesopotamia and afforestation.** Indian Forester 44: 476–485. Oct., 1918.—It is problematic that the Mesopotamian country ever supported much forest, but the irrigation which is to be developed under British aid will call for a greater population and need for fuel and small sizes of timber. This can probably be grown to some extent in the irrigated lands, but it is doubtful if, with the small rainfall, it will be possible without the aid of additional water. It is possible that the higher country receives enough rainfall to make a growth of some kind of material possible. At best, the forest would be open and composed more or less of xerophytic species.—*E. N. Munns.*

1185. OSMASTON, A. E. **Note on some chir seed eaters.** Indian Forester 44: 462–467. Oct., 1918.—Chir pine (*P. longifolia*) produces large quantities of edible seed which are destroyed by many agencies, though there is abundant reproduction. Man, monkies, flying-squirrels, wood-pigeons, nut-crackers, woodpeckers, and grosbeaks are the agencies responsible for this destruction, and each of these is discussed.—*E. N. Munns.*

1186. PEARSON, C. H. **Uses of the Brazil-nut tree.** Amer. Forestry 25: 782–784. *5 fig.* 1919.—A popular description of *Bertholletia excelsa*, including tree characters, distribution, the wood and its uses, the native method of gathering the seeds, value of seeds exported and use of inner bark for making oakum.—*Chas. H. Otis.*

1187. PEARSON, R. S. **Preliminary note on the seasoning of some Indian timbers by natural methods.** Indian Forest Rec. 7^1: 1–73. *1 pl.* 1919.—Tests were made in 6 provinces to determine the best treatment to be accorded both logs and timber. No one method was found to be suitable for every wood, and the result of the work is given for 33 woods in descriptive detail and in tables.—*E. N. Munns.*

1188. RAITT, WM. **Note on the prospects of manufacturing paper-pulp from Himalayan soft-woods.** Indian Forester 44: 510–512. Nov., 1918.—At the date of writing the value of spruce and fir (sp?) wood has become greater in construction and manufacturing work than for paper-making, reducing the amount of pulp manufactured. Saw-mill waste is generally difficult to handle for pulp, but under present conditions it may become profitable. Figures are given on costs of installation of plants and possible profits.—*E. N. Munns.*

1189. RIDSDALE, P. S. **French forests for our army.** Amer. Forestry 25: 963–972. *14 fig.* 1919.

1190. SWAINE, J. M. **Canadian bark beetles.** *4 parts. 31 pl., 262 fig.* Dominion Dept. Agric., Entomological Branch, Forest Insect Division: Ottowa, 1918.—Part 1, "Descriptions of new species," describes 40 new species of Canada and northern United States. Part 2 gives "A preliminary classification with an account of the habits and methods of control."

Part 3 gives a short account of the structural characters of bark beetles. Part 4 presents an arrangement of Canadian bark beetles with keys for their determination. [Through abst. in: Canadian Forest Jour. 14: 12. Jan., 1919.]—*E. N. Munns.*

1191. Tillotson, C. R. **The possibilities of farm woodland development under the Smith-Lever Act.** Amer. Forestry 25: 785–787. *4 fig.* 1919.

1192. Trevor, C. G. **A new system of timber exploitation.** Indian Forester 44: 525–527. Nov., 1918.—The yield of deodar, *Cedrus deodara,* is given by diameters and quality, three sites being recognized, for the Kulu Division. Volumes are given in cubic feet and in scantlings.—*E. N. Munns.*

GENETICS

George H. Shull, *Editor*

1193. Adami, I. G. **Medical contributions to the study of evolution.** *xviii + 372 p.* London, 1918.—See also Bot. Absts. 2, Entry 1226; 3, Entry 585.

1194. Allard, H. A. **Gigantism in Nicotiana tabacum and its alternative inheritance.** Amer. Nat. 53: 218–233. May–June, 1919.—See Bot. Absts. 3, Entry 216.

1195. Allard, H. A. **The Mendelian behavior of aurea character in a cross between two varieties of Nicotiana rustica.** Amer. Nat. 53: 234–238. May–June, 1919.—See Bot. Absts. 3, Entry 217.

1196. Bartlett, J. Gardner. **The increase, diffusion, and decline of the Mayflower and other New England stock.** Jour. Heredity 10: 141–142. Mar., 1919.

1197. Baur, E. **Über eine eigentümliche mit absoluter Koppelung zusammenhängende Dominanzstörung. [On a characteristic disturbance of dominance correlated with complete linkage.]** Ber. Deutsch. Bot. Ges. 36: 107–111. 1918.

1198. Baur, Erwin. **Mutationen von Antirrhinum majus. [Mutations of Antirrhinum majus.]** Zeitschr. indukt. Abstamm. Vererb. 19: 177–193. *10 fig.* June, 1918.—Preliminary paper summarizing in general fashion studies of a series of mutants of *Antirrhinum majus.* Apart from certain mutants in this species, involving chromatophore characters exhibiting non-Mendelian inheritance, all the mutants found appear to differ from their parent races in only one Mendelian factor. These latter number 20, and nearly all are "loss mutations" and recessives. Some have occurred several times, but most of them have been found but once. Three distinct modes of occurrence are described: 1. In the sexual descendants of one individual, the mutant may occur as a heterozygote (heterozygous mutant from seed). 2. In the sexual descendants of one individual, the mutant may arise as a homozygote (homozygous mutant from seed). 3. In a single plant, vegetative tissue areas or entire shoots may arise as heterozygous mutants.—Several examples of each mutant class are described in detail, together with figures illustrating their ancestry through several generations. In addition to the three classes above mentioned, a fourth may be assumed to occur (homozygous mutation from a single vegetative cell). Baur has never found this type in his cultures, and investigation of the literature has discovered only one case.—During the past 14 years, over 200,000 plants of *A. majus* have been studied and data on the relative frequency of the various classes or modes of mutation have been kept. Mutations under mode 1 approximate a frequency of 20 per cent.; under mode 2, a frequency of 0.05 per cent., the former occurring 40 times as often as the latter. Mutations of mode 3 type were observed in five cases, but owing to difficulties in detecting them, involving the character of the factorial composition of the material, many more cases no doubt occurred. Hence, this type or mode is assumed to have the highest frequency, while types involving mode 4 are the rarest, if they occur at all in this species.—In *Antirrhinum* both varietal and specific genetic differences have been investigated, especially as regards the form, size, and color of the flowers. With but few exceptions all character differences studied Mendelize. Thirty factors in the floral organs alone of *A. majus* have been isolated. Owing chiefly to the much larger number of chromosomes in Antirrhinum (at least 15 pairs), the relative frequency of observed factor linkage is much less than in organisms such as *Hordeum* and *Drosophila* with comparatively few chromosomes. Only two linkage groups have so far been observed, each of which consists of 3 factors in which linkage or coupling is absolute. Both these groups are assumed to be localized in different chromomeres. Baur suggests that in certain chromosomes and chromomeres, mutations may take place more easily than in others.—*Orland E. White.*

1199. Becking, Baas. [Rev. of: Kapteyn, J. C. **Skew frequency curves in biology and statistics.** Rec. Trav. Bot. Néerland. 13: 105–157. 1916.] Genetica 1: 183–187. Mar., 1919.

1200. Becking, Baas. [Rev. of: Jennings, H. S. **Heredity, variation and the results of selection in the uniparental reproduction of Difflugia corona.** Genetics 1: 407–534. 1916.] Genetica 1: 179–182. Mar., 1919.

1201. Becking, Baas. [Rev. of 2 papers: (1) Harris, F. S., and J. C. Hogenson. **Some correlations in sugar beets.** Genetics 1: 334–347. 1916. (2) Pritchard, F. J. **Correlations between morphological characters and the saccharine content of sugar beets.** Amer. Jour. Bot. 3: 361–376. *8 fig.* 1916.] Genetics 1: 170–172. Mar., 1919.

1202. Bernard, N. **L'evolution des plantes. [The evolution of plants.]** *314 p., 29 fig.* Felix Alcan: Paris, 1918. See also Bot. Absts., 2, Entry 1244.

1203. Blakeslee, Albert F., and B. T. Avery, Jr. **Mutations in the jimson weed.** Jour. Heredity 10: 111–120. *Fig. 5–15.* Mar., 1919.

1204. Bridges, Calvin B. **The genetics of purple eye color in Drosophila.** Jour. Exp. Zool. 28: 255–305. May 20, 1919.—See Bot. Absts. 3, Entry 601.

1205. Dawson, Andrew Ignatius. **Bacterial variations induced by changes in the composition of culture media.** Jour. Bac. 4: 133–148. Mar., 1919.

1206. Decoux, A. **Breeding of Crimson-eared Waxbill × Cordon Bleu hybrids.** Avic. Mag. 10: 102–103. Apr., 1919.—Several broods of hybrids were obtained from a female Cordon Bleu mated with a male Violet-eared Waxbill, but in no case were the hybrids brought to maturity, mostly on account of neglect by the parent birds.—*R. E. Clausen.*

1207. Decoux, A. **Breeding of Melba Finch × Crimson-eared Waxbill hybrids.** Avic. Mag. 10: 110–111. Apr., 1919.—Three broods of hybrids were obtained from a Crimson-eared Waxbill hen mated to a Melba Finch cock. Hybrid fledglings resembled young Crimson-eared Waxbills, but were larger and showed distinct evidences of hybrid origin. A full description of adult hybrids is given. In shape they resembled Crimson-eared Waxbill, but in size and in song they were like the male parent.—*R. E. Clausen.*

1208. Delage, Yves. **Suggestion sur la nature et les causes de l'hérédité ségrégative (caractères mendéliens) et de l'hérédité agrégative (caractères non-mendéliens).** [Suggestion as to the nature and the causes of segregative heredity (Mendelian characters) and of aggregative heredity (non-Mendelian characters).] Compt. Rend. Acad. Sci. Paris. 168: 30–36. 1919.—Author rejects current explanation of heredity involving individuality of chromosomes and reduction division in maturation. Theory has required "tottering scaffolding" of accessory hypotheses "destined to fall in ruins." In its place author suggests following two propositions: First, sperm may in some cases initiate development of egg, but its chromatin not participate in that development (Baltzer on echinoderm crosses). Second, when chromatin of both parents is functional, maternal and paternal contributions may be relatively heterogeneous or homogeneous. If heterogeneous, microsomes (perhaps) of chromosomes do not fuse, later separate and bring about segregative (Mendelian) heredity. If homogeneous, microsomes may fuse completely, never separating into original components, accounting for aggregative (non-Mendelian, blending) inheritance. Variety of conditions may exist between these extremes. Qualitative characters probably depend upon heterogeneous chromatin, quantitative characters on homogeneous chromatin. Same chromosome may present different degrees of heterogeneity in different parts, so that certain characters are aggregative, others segregative. Different individuals of same race may show different degrees of heterogeneity.—*A. Franklin Shull.*

1209. Derschau, M. von. **Über disperme Befruchtung der Antipoden bei Nigella arvensis. [On double fertilization of the antipodals in Nigella arvensis.]** Ber. Deutsch. Bot. Ges. **36**: 260–263. 1918.

1210. De Vries, H. **Phylogenetische und gruppenweise Artbildung. [Phylogenetic and group-wise formation of species.]** Flora **11, 12** (Festschr. Stahl.): 208–226. 1918.

1211. De Vries, H. **Halbmutanten und Massenmutationen. [Half mutants and mass mutations.]** Ber. Deutsch. Bot. Ges. **36**: 193–199. 1918.

1212. Dresel, K. **Inwiefern gelten die Mendelschen Vererbungsgesetze in der menschlichen Pathologie? [To what extent do Mendelian laws of heredity hold in human pathology?]** Virchow's Arch. **224**. *256 p.* 19—.

1213. Ernst, A. **Bastardierung als Ursache der Apogamie im Pflanzenreich; eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre. [Hybridization as the cause of apogamy in the plant kingdom; an hypothesis for experimental evolution and genetics.]** *8vo, xv + 655 p., 172 fig.* Gustav Fischer: Jena, 1918.—See also Bot. Absts. 2, Entry 1234.

1214. Freeman, Geo. F. **Heredity of quantitative characters in wheat.** Genetics **4**: 1–93. Jan., 1919.—See Bot. Absts. 3, Entry 629.

1215. Frets, G. P. **Erfelijkheid en eugeniek. [Heredity and eugenics.]** Social Gids. **3**: 23–38, 155–173. 1918.

1216. Fruwirth, C. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. II. Die Züchtung von Mais, Futterrüben und anderen Rüben, Oelpflanzen und Gräsern. [Handbook of agricultural plant breeding. II. The breeding of maize, fodder beets, and other roots, oil plants and grasses.]** *3rd ed., 262 p., 50 fig.* P. Parey: Berlin, 1918.—See also Bot. Absts. 2, Entry 1245.

1217. Goebel, K. **Zur Kenntnis der Zwergfarne. [To a knowledge of the dwarf ferns.]** Flora **11, 12** (Festschr. Stahl): 268–281. 1918.

1218. Goedewaagen, M. A. J. [Rev. of: Freeman, G. F. **Linked quantitative characters in wheat crosses.** Amer. Nat. **51**: 683–689. 1917.] Genetica **1**: 161–162. Mar., 1919.

1219. Goedewaagen, M. A. J. [Rev. of: Lotsy, J. P. **Antirrhinum rhinanthoides mihi, une nouvelle espéce Linnéenne, obtenue experimentalement. (Antirrhinum rhinanthoides mihi, a new Linnean species, derived experimentally.)** Arch. Néerland. Sci. **3**: 195–204. 1916.] Genetica **1**: 188–190. Mar., 1919.

1220. Goeddewaagen, M. A. J. [Rev. of: Jones, D. F. **Linkage in Lycopersicum.** Amer. Nat. 51: 608–621. 1917.] Genetica 1: 182–183. Mar., 1919.

1221. Jones, D. F., and C. A. Gallastegui. **Some factor relations in maize with reference to linkage.** Amer. Nat. 53: 239–246. May–June. 1919.

1222. Kattur, G. L. **An improved type of cotton for the southern Maratha Country.** Agric. Jour. India 14: 165–167. *Pl. 1.* 1919.—See Bot. Absts. 3, Entry 170.

1223. Key, Wilhelmine E. **Better American families. II.** Jour. Heredity 10: 80–83. Feb., 1919.

1224. Key, Wilhelmine E. **Better American families. III.** Jour. Heredity 10: 107–110. Mar., 1919.

1225. Kirkham, William B. **The fate of homozygous yellow mice.** Jour. Exp. Zool. 28: 125–135. *2 fig.* May 20, 1919.—See Bot. Absts. 3, Entry 264.

1226. Kohlbrugge, J. H. F. [Rev. of: Adami, I. G. **Medical contributions to the study of evolution.** *xviii + 372 p.* London, 1918.] Genetica 1: 149–152. Mar., 1919.

1227. Kohlbrugge, J. H. F. [Rev. of: Luschan, F. von. **Kriegsgefangene. [Prisoners of war.]** *117 p.* Reimer: Berlin, 1917.] Genetica 1: 190–192. Mar., 1919.

1228. Kooiman, H. N. **Overzicht over enkele Oenothera problemen. [Review of a few Oenothera problems.]** Genetica 1: 134–148. Mar., 1919.

1229. Kooiman, H. N. [Rev. of: Gates, R. R. **Vegetative segregation in a hybrid race.** Jour. Genetics 6: 237–253. 1917.] Genetica 1: 163–164. Mar., 1919.

1230. Kooiman, H. N. [Rev. of: Ikeno, S. **Studies on the hybrids of Capsicum annuum. II. On some variegated races.** Jour. Genetics 6: 201–229. *1 pl., 2 fig.* Apr., 1917.] Genetica 1: 176–177. Mar., 1919.

1231. Kooiman, H. N. [Rev. of: Heribert-Nilsson, N. **Eine mendelsche Erklärung der Verlustmutanten. [A Mendelian explanation of loss mutants.]** Ber. Deutsch. Bot. Ges. 34: 870–880. 1917.] Genetica 1: 202–203. Mar., 1919.

1232. Kooiman, H. N. [Rev. of: Klebs, G. **Ueber erbliche Blütenanomalien beim Tabak. [Concerning hereditary floral anomalies in tobacco.]** Zeitschr. indukt. Abstamm. Vererb. 17: 53–117. 1916.] Genetica 1: 187–188. Mar., 1919.

1233. Kooiman, H. N. [Rev. of: Punnett, R. C. **Reduplication series in sweet peas. II.** Jour. Genetics 6: 185–193. 1917.] Genetica 1: 206–207. Mar., 1919.

1234. Lotsy, J. P. [Rev. of: Ernst, A. **Bastardierung als Ursache der Apogamie im Pflanzenreich; eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre. [Hybridization as the cause of apogamy in the plant kingdom; an hypothesis for experimental evolution and genetics.]** *655 p., 172 fig.* Gustav Fischer: Jena, 1918.] Genetica 1:158–161. Mar., 1919.

1235. Lotsy, J. P. [Rev. of: Jaeger, F. M. **Lectures on the principle of symmetry and its application in all natural sciences.** *333 p., 170 fig.* Elsevier: Amsterdam, 1917.] Genetica 1: 177–179. Mar., 1919.

1236. Pascher, A. **Über die Beziehung der Reduktionsteilung zur Mendelschen Spaltung. [On the relation of the reduction division to Mendelian segregation.]** Ber. Deutsch. Bot. Ges. 36: 163–168. 1918.

1237. Pearl, Raymond. **The seasonal distribution of swine breeding.** Sci. Monthly 19: 244–251. Sept., 1918.—Registry records in 1913–14 of pure-bred swine breeds, Poland China and Duroc Jersey, were used to determine random date of birth by litters in four zones in U. S. Amer., northern, southern, north central, and south central. Frequency populations in month classes were then arranged based on 500 records for each breed in each zone. Average of all records show multimodal curve for date of birth with modes on March and September. Out of a total of 4000 records, 2096 were born in March and April and 477 in September and October.—*H. K. Hayes.*

1238. Péterfi, M. **Über Bastarde der Pulmonaria rubra Schott et Ky. [On hybrids of Pulmonaria rubra Schott and Ky.]** Bot. Museumshefte [Bot. Múzeumi Füzetek.] ( ) 1916 2: 35–41. 1918.

1239. Pomeroy, Carl S. **Bud variations in sugar cane.** Jour. Heredity 10: 129–135. *Fig. 16–17.* Mar., 1919.

1240. Preiser, Samuel A., and Charles B. Davenport. **Multiple neurofibromatosis (von Recklinghausen's disease) and its inheritance with description of a case.** Eugenics Rec. Office Bull. 19: 1–34. *36 fig.* Oct., 1918.—See Bot. Absts. 3, Entry 281.

1241. Punnett, R. C. **Note on the origin of a mutation in the sweet pea.** Jour. Genetics 8: 27–31. *1 fig.* Dec., 1918.—Details history of origin of "cretin" mutant in the sweet pea. Describes chief characteristics of the mutant form and its genetic behavior. Mutant is recessive and appeared as a single plant in the F_4 generation from a cross of two white-flowered varieties. Differs from parent in a single factor and is believed to have resulted from "some radical alteration in the zygote after union between two normal gametes had already taken place,"—in other words, after fertilization.—*Orland E. White.*

1242. Pusch, G. **Inbreeding live stock.** Jour. Heredity 10: 88–89. Feb., 1919.

1243. Rabaud, Étienne. **Évolution et sexualité. [Evolution and sexuality.]** Scientia 25: 275–287. 1919.—See Bot. Absts. 3, Entry 660.

1244. Sirks, M. J. [Rev. of: Bernard, N. **l'Évolution des plantes. [The evolution of plants.** *314 p., 89 fig.* Felix Alcan: Paris, 1918.] Genetica 1: 153–156. Mar., 1919.

1245. Sirks, M. J. [Rev. of: Fruwirth, C. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. II. Die Züchtung von Mais, Futterrüben und anderen Rüben, Oelpflanzen und Gräsern. [Handbook of agricultural plant breeding. II. The breeding of maize, fodder beets, and other roots, oil plants and grass.** *3rd ed., 262* p., *50 fig.* P. Parey: Berlin, 1918.] Genetica 1: 162–163. Mar., 1919.

1246. Sirks, M. J. [Rev. of: Heribert-Nilsson, N. **Naturens ändamalsenlighet och olika artbildningsteoriers ställning till denna frågen. (Doelmatigheid in de natur en het standpunt der verschillende theorieën over het ontstaan der soorten ten opzichte van dit vraagstuk.)** *48 p.* A. Bonnier: Stockholm, 1917.] Genetica 1: 203–205. Mar., 1919.

1247. Stakman, E. C., M. N. Levine, and J. G. Leach. **New biologic forms of Puccinia graminis.** Jour. Agric. Res. 16: 103–105. Jan. 20, 1919.—See Bot. Absts. 2, Entry 1082.

1248. STARK, MARY B. **An hereditary tumor in the fruit fly Drosophila.** Jour. Cancer Res. 3: 279–301. *1 pl., 2 fig.* July, 1918.—Lethal factor "7" in Drosophila is sex-linked in inheritance and kills 50 per cent of the males in stocks possessing it. The somatic manifestation of this factor in such animals is one or more black spots appearing in the larvae. Sections of these spots show them to be due to cellular growths somewhat resembling tumors of the higher vertebrates and having pigment both inside of and outside the cells. All larvae having tumors die between the second day and pupation. The tumors have little pigment in their early stages but become increasingly darker with age. No correlation exists between size of larva and size of tumor. Tumors may occur in any segment of body, most frequently in segments 6 and 12. Tumors were removed by operation under ether and about 5 per cent. of the operated larvae lived. None of these pupated. A control series of normal larvae gave 5 per cent. survival after operation and successful pupation in all of these. A toxic effect is exerted upon larvae injected with suspension of ground tumor cells in Locke's solution. A series of experiments with X-rays showed no visible effect upon the tumors.—*C. C. Little.*

1249. STARK, MARY B. **An hereditary tumor.** Jour. Exp. Zoöl. 27: 509–529. *3 pl.* Feb., 1919.—Tumor cells multiply in sterile drops of Locke's solution. Implants of living tumor into adult flies produce growths in rare cases. In these cases, death eventually results from toxic action of the tumor. Growth of tumor occurred in 2 out of 40 meal-worm larvae inoculated under absolutely aseptic conditions with bits of the tumor. Carefully controlled series of sterile cultures of egg preparations show tumor not due to infection. Excessive pigmentation of tumor is probable due to imperfect metabolism. Fifteen tumors have been observed in a single larva. Some of these may be metastases. Pieces broken from the tumor artificially inside the body, show growth. Irregularities of mitotic figures have been noted in rapidly growing tumors. All tumors have developed in embryonic rudiments destined during pupation to form adult organs.—*C. C. Little.*

1250. STARK, P. [Rev. of: LEHMANN, ERNST. **Variabilität und Blütenmorphologie. [Variability and floral morphology.]** Biol. Zentralbl. 38: 1–38. Jan., 1918.] Zeitschr. Bot. 10: 552–553. 1918.

1251. STOUT, A. B. Bud variation. Proc. Nation. Acad. Sci. 5: 130–134. Apr., 1919.—See Bot. Absts. 3, Entry 292.

1252. STOUT, A. B., AND HELENE M. BOAS. **Statistical studies of flower number per head in Cichorium intybus: kinds of variability, heredity, and effects of selection.** Mem. Torrey Bot. Club 17: 334–458. June 10, 1918.

1253. TISCHLER, G. **Untersuchungen über den anatomischen Bau der Staub- und Fruchtblätter bei Lythrum Salicaria, mit Beziehung auf das Illegitimitätsproblem. [Studies of the anatomical structure of the stamens and carpels in Lythrum Salicaria, with reference to the problem of illegitimacy.]** Flora 11, 12 (Festschrift Stahl): 162–192. 1918.

1254. TISCHLER, G. **Das Heterostylie-Problem. [The problem of heterostyly.]** Biol. Zentralbl. 38: 461–479. Nov., 1918.

1255. WEATHERWAX, PAUL. **The morphological basis of some experimental work with maize.** Amer. Nat. 53: 269–272. May–June, 1919.—See Bot. Absts. 3, Entry 303.

1256. WESTRIENEN, A. v. [Rev. of: STIEVE, H. **Ueber Ectrodactylie. [On ectrodactyly.]** Zeitschr. Morph. u. Anthrop. 20: 1917.] Genetica 1: 207–208. Mar., 1919.

1257. WHITE, E. A. **Methods of rose-breeding.** Amer. Rose Ann. 1918: 51–55. *7 fig.* 1918.—See Bot. Absts. 3, Entry 304.

1258. Whiting, P. W. **Two striking color variations in the green frog.** Jour. Heredity, 10: 127-128. Mar., 1919.

1259. Wicks, W. H. **The effect of cross-pollination in size, color, shape and quality of the apple.** Monthly Bull. State Comm. Hortic. California 7: 568-573. Oct., 1918.

HORTICULTURE

J. H. Gourley, *Editor*

GENERAL

1260. Barnes, Will C. **Pruning for profit. Are you raising fruit or wood?** Amer. Forestry 25: 798-800. *2 fig.* 1919.—About orange groves; popular.—*Chas. H. Otis.*

1261. Bean, W. J. **Deutzia compacta.** Curtis Bot. Mag. 15: *Pl. 8795* (*colored*). 1919.

1262. Beckwith, Charles S. **Report on cranberry investigations for the season of 1918.** Proc. Ann. Meet. 49: 3-15. Amer. Cranberry Growers' Assoc. *Pl. 1-6.* 1919.—This is a report of work carried on at the New Jersey Cranberry Substation. Nitrogen from nitrate of soda gave immediate and large increase of yield when applied on Savannah bottoms over a period of six years. Nitrogen from dried blood and cotton seed meal gave slower increases, while ammonium sulfate was unsatisfactory. Phosphoric acid from acid phosphate and phosphate rock gave good increases while that derived from basic slag and steamed bone gave only small increases. Potash from muriate and kainit gave poor results, while that from sulfate of potash gave only a low increase.—On mud bottoms nitrogen from all sources gave poor results. Phosphoric acid from acid phosphate, phosphate rock and steamed bone gave fair to good results, while that from basic slag was unsatisfactory. Results from potash from all sources were poor or doubtful.—On iron ore bottoms nitrogen gave poor and in some cases disastrous results, while phosphoric acid from phosphate rock gave somewhat more favorable results.—Tests of mixed fertilizers indicate that certain forms are beneficial on Savannah bottoms while on mud and iron ore bottoms, results were inconclusive.—It was found that sodium cyanide dissolved in water was fairly effective in killing the girdle worm [Crambus hortuellus, Hbn (?)].—*J. K. Shaw.*

1263. Buswell, W. M. **The roselle.** Amer. Bot. 25: 14. *1 fig.* 1919.—The roselle (*Hibiscus sabdariffa*) reported as being sold under the name of Florida cranberries.—*W.N. Clute.*

1264. Coit, J. Eliot, and Robert W. Hodgson. **An investigation of the abnormal shedding of young fruits of the Washington navel orange.** Univ. California Publ. Agric. Sci. 3: 283-368. *Pl. 25-42, fig. 1-9.* 1919.—Experiments conducted near Bakersfield, California, to determine the cause of the summer drop of immature fruits of the navel orange. The district is semiarid and trees are artificially irrigated with water from wells. The trees annually suffer a heavy loss of small immature fruits.—Abscission of larger fruits is believed to be due to infection with *Alternaria citri*, E. and P., which enters through the scars left by the fall of the pistils. The hypothesis is advanced that excessive transpiration from the leaves causes water, together with the enzymatic solutions secreted by the fungus in the "navel end" of the orange to be drawn back through the vascular system of the young fruits through the pedicel and to afford the stimulus to abscission. The fungus is reported to cause a black rot of large and mature oranges.—The major part of the abscission of small fruits in the first weeks of their growth is believed to be due to a succession of daily water deficits in the young fruits due to the high temperature and low water content of the atmosphere. Readings of a porous clay atmometer bulb showed a very high rate of water loss. Observations in a grove bearing a companion crop of alfalfa showed that the rate of water loss there was markedly reduced and that the trees yielded larger crops of fruit.—The authors believe that the shedding of young fruits may be overcome by such practices as, heavier and more frequent irrigation, the planting of summer intercrops, mulching with straw, protection by means of windbreaks, and moderate winter pruning.—*H. S. Reed.*

1265. MCCLELLAND, T. B. **Influence of foreign pollen on the development of vanilla fruits.** Jour. Agric. Res. 16: 245–251. *Pl. 31–35.* 1919.—Attempts have been made to establish vanilla growing on a commercial scale in Porto Rico. Two types of plant are of economic value: *Vanilla planifolia* and *Vanilla* spp. The former is a plant having small, pale green blossoms, developing a long slender capsule tapering at the stem end but carrying its fullness well down towards the blossom end. It is of high quality. The latter type represents a group of varieties or species known as "vanillon" which agree in having large, yellow blossoms, fruits which are much thicker and shorter than those of *V. planifolia*, being of a more uniform thickness throughout.—When reciprocal crosses are made, a decided modification in the form of the fruit has resulted. It is usually so marked that these fruits can be distinguished from close fertilized fruits at a glance. Average relative girth measurements at stem-end and at blossom-end of *V. planifolia* selfed are 21.8 and 26.7 respectively and when fertilized with pollen from vanillon, 27.7 and 22.2. Similar measurements for vanillon selfed are 39.4 and 39.2 and of vanillon fertilized with pollen from *V. planifolia* 32.7 and 42.—These alterations are due to the difference in location of the ovules fertilized by the two kinds of pollen and a possible explanation of this is to be found in the relative proportions of the essential parts in the two flowers. At blossoming time, the ovaries are of about the same length but the style in the vanillon flower is much longer (up to 70 per cent.) than that of *V. planifolia*. But it is necessary to assume that there must be a certain maturity of development of the pollen tube before the ovule can be fertilized.—*D. Reddick.*

1266. MEEKING, ERNEST. **Standardized packing and grading of fruit.** Jour. Dept. Agric. Victoria 16: 741–746. *Pl. 3–7.* 1918.—A continuation of an earlier article (*ibid.* 16: 317) describing shipping cases for fruit and discussing the Fruit Case Act, which came into force in 1906.—*J. J. Skinner.*

1267. ROLFE, R. A. **Bulbophyllum robustum.** Curtis Bot. Mag. 15: *Pl. 8792 (colored).* 1919.

1268. ROLFE, R. A. **Govenia lagenophora.** Curtis Bot. Mag. 15: *Pl. 8794 (colored).* 1919.

1269. ROLFE, R. A. **Isabelia virginalis.** Curtis Bot. Mag. 15: *Pl. 8787 (colored).* 1919.

PRODUCTS

1270. JOHNS, CARL O., A. J. FINKS, AND C. E. F. GERSDORFF. **Globulins of the cocoanut, Cocos nucifera. I. Preparation of cocoanut globulin. Distribution of the basic nitrogen in cocoanut globulin.** Jour. Biol. Chem. 37: 149–153. 1919.—See Bot. Absts. 2, Entry 147.

1271. JOHNS, CARL O., A. J. FINKS, AND MABEL S. PAUL. **Studies in nutrition. I. The nutritive value of cocoanut globulin and cocoanut press cake.** Jour. Biol. Chem. 37: 497–502. 1919.—The globulin of the cocoanut produces normal growth when used as the sole source of protein in an otherwise complete diet. Cocoanut press cake contains sufficient water-soluble vitamine and some fat-soluble vitamine, but the rate of growth is increased by adding butter fat to the diet.—*George B. Rigg.*

MORPHOLOGY AND TAXONOMY OF ALGAE

J. R. Schramm, *Editor*

1272. Anonymous. **Kelp potash production.** Pacific Fisherman 17: 64. 1919. Note on amount produced.—*T. C. Frye.*

1273. Church, A. H. **The phaeophycean zoid.** Jour. Bot. 57 (Suppl. II.): 1–7. 1919.—The motile cells in Phaeophyceae, viewed as retained flagellate phases in the life history of brown algae, are discussed in the light of older and more recent investigations. The point of insertion of the lateral cilia is regarded as the original "pole" of the zoid, the direction of the movement, however, implying that a change of polarity of about 90° has taken place from the original isokont condition with equal and distally inserted flagella. This change is believed to be correlated with a differentiation in function between the two flagella, one becoming a propeller and the other remaining a tractor, the two attaining a divergence of 180° in a direction at right angles to the original axis of polarity; in this way, the new "anterior" end is acquired. The term "anisokont" is suggested for the condition obtaining in the phaeophycean zoid with unequal and "laterally inserted" flagella. The author states that the older view that the flagella are formed from a peripheral zone of cytoplasm must be replaced by the view that they originate as outgrowths from a basal granule, as in many flagellates. The flagella are discussed as regards movements, length in relation to body of zoid, function as tactile sensitive organs, etc. Rate and duration of movement of zoid are also discussed as well as metabolic and ameboid movements of the zoid body. Considerable space is devoted to the modification of the zoid in consequence of the development of heterogamy and to its variation in different phyla of brown algae. The author considers that the flagella originally served to provide a means of vertical ascent, and not of lateral movement, for autotrophic pelagic phytoplankton organisms; in the Phaeophyceae, on the other hand, this inherited mechanism serves to bring gametes into proximity, although in forms living in violently agitated waters the flagella are of little value in this respect and are reduced (Dictyotaceae), as they have been with complete loss in the red algae. In quiet waters, the cilia are regarded as the only means of sexual approximation and as such may prove increasingly useful and tend to become exaggerated.—*J. R. Schramm.*

1274. Groves, J., and G. R. Bullock-Webster. **New variety of Nitella flexilis.** Jour. Bot. 57: 101–102. 1919.—*N. flexilis* var. *Fryeri* is described as new, from Cambridgeshire, West Norfolk, and in Huntingdonshire. It resembles *N. opaca.*—*K. M. Wiegand.*

1275. Mirande, Marcel. **Sur le chondriome, les chloroplastes et les corpuscules nucléolaires du protoplasme des Chara. [Concerning the chondriosome, chloroplasts, and nucleolar corpuscles in Chara.]** Compt. Rend. Acad. Sci. Paris 168: 283–286. *Fig. 1–7.* 1919.—Two species of *Chara*, *C. foetida* and *C. hispida*, were studied. Chondriosomes were found in all cells except those of the spermatogenous tissue of the antheridia.—The chloroplasts are located in the immobile layer of cytoplasm at the periphery of the cells. They appear in the initial cells as a mass of granules around the nucleus and at this stage have staining qualities similar to nucleoles. Author finds these granules to be identical with those observed by Kaiser (1896), Debski (1897, 1898), and Strasburger (1908). These granules were identified by Debski as being identical with the extra-nuclear nucleoles of Zimmermann (1896).—The granules soon migrate to the peripheral layer and enlarge, fragment, and turn green. In the cells of *Chara* are found granules staining like nucleoles which the author believes are nucleolar in nature and which appear to have been extruded from the nuclei.—*V. H. Young.*

1276. Transeau, E. N., and Hanford Tiffany. **New Oedogoniaceae.** Ohio Jour. Sci. 19: 240–243. *Pl. 14.* 1919.—Descriptions are given of the following undescribed forms: *Oedogonium hystricinum* and *O. Pisanum gracilis* from Illinois; and *Bulbochaete Bullardi* from Massachusetts.—*H. D. Hooker, Jr.*

1277. TURRENTINE, J. W. **Progress of the kelp potash industry.** Pacific Fisherman Year Book 1919: 111. 1919.—See Bot. Absts. 2, Entry 134.

1278. VANGOOR, A. C. J. **Zur Kenntnis der Oscillatoriaceen.** **[On Oscillatoriaceae.]** Recueil Trav. Bot. Néerland. 15: 255–262. *Pl. 2.* 1918.—The following new species are described from Holland: *Oscillatoria guttulata*, *O. amphigranulata*, *O. Redekei*, *O. Annae*, and *Lyngbya amplivaginata*. All the species are illustrated. In *Oscillatoria guttulata* many pseudovacuoles (the gas vacuoles of Klebahn) occur, which the author regards, with Molisch, as protoplasmic in nature; since the species is probably not a true plankton form, the author emphasizes that it presents another case contrary to the assertion of Klebahn that pseudovacuoles occur only in floating blue green algae.—*J. R. Schramm.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

1279. FLORIN, R. **Cytologische Bryophytenstudien. I. Über Sporenbildung bei Chiloscyphus polyanthus (L.) Corda.** **[Spore-formation in Chiloscyphus polyanthus.]** Ark. för Bot. 15^{16}: 1–10. *Pl. 1, fig. 1–2.* 1918.—The heterotypic division is here described for the first time in one of the acrogynous Jungermanniales. No evidence of a quadripolar spindle could be found, the division proceeding in the usual way. Before the first stages make their appearance the spore mother cell already shows the lobate form, characteristic of so many Hepaticae, and the nucleus also appears more or less distinctly angular. The stages shown most clearly are the strepsinema, the diakinesis and the metaphase, the number of double chromosomes present being apparently ten. The homotypic division was not studied, but the fact was demonstrated that the formation of cell walls is delayed until both divisions have been completed.—*A. W. Evans.*

1280. FLORIN, R. **Das Archegonium der Riccardia pinguis** (L.) B. Gr. Svensk. Bot. Tidsk. 12: 464–470. *Fig. 1–4.* 1918.—In the first part of the paper several abnormal archegonia are described. In one of these the usual canal cells and egg are replaced by a row of egg-like cells with large nuclei and dense cytoplasm; in another two rows of canal cells are present; in a third the ventral canal cell shows two nuclei but no dividing wall; and in a fourth four nuclei are present in the egg cell. In the second part of the paper centrosome-like bodies are demonstrated in the egg cell. These are situated on opposite sides of the nucleus and from each one numerous rays extend almost to the periphery of the egg.—*A. W. Evans.*

PATHOLOGY

DONALD REDDICK, *Editor*

1281. ANONYMOUS. **Smut in oats and barley.** Jour. Bd. Agric. [London] 24: 1417–1419. 1918. Issued also as Food Production Leaflet 31.—Brief descriptions of the smuts with directions for control.—*D. Reddick.*

1282. ANONYMOUS. **Parsnip disease and its prevention.** Jour. Bd. Agric [London] 24: 1123. 1918.—Apparently a brief of COTTON, A. D. **Diseases of parsnips.** [See Bot. Absts. 1, Entry 1664.]

1283. BEACH. WALTER SPURGEON. **Biologic specialization in the genus Septoria.** Amer. Jour. Bot. 6: 1–33. *Pl. 1, 13 diagrams, 4 tables, 1 graph.* 1919.—Author briefly reviews the literature dealing with biologic specialization. 16 species of *Septoria* were studied as to their host relations. Most species do not have a broad range of hosts, but are limited to one or a few closely related species, usually belonging to the same genus. In many cases the host ranges were found to be narrower than those recorded in the host indices. Certain species evidently are differentiated into biologic forms, since forms morphologically similar will not infect the same hosts. The disease characters of the host vary with the species, age and part of the host attacked, and with environmental conditions, and therefore are unreliable in taxonomy. Morphological characters in certain species of *Septoria*, particularly spore length, vary considerably under different environmental conditions and the taxonomic importance of such characters is therefore doubtful. Inoculation experiments showed that *S. malvicola* E. & M. and *S. fairmani* E. & E. are identical. The form of *S. convolvuli* upon *Convolvulus arvensis* is biologically as well as morphologically distinct from the type form of *S. convolvuli* described upon *C. sepium*, and is here proposed as a new species, *S. septulata*.—*E. W. Sinnott.*

1284. Coit, J. Eliot, and Robert W. Hodgson. **An investigation of the abnormal shedding of young fruits of the Washington navel orange.** Univ. California Publ. Agric. Sci. 3: 283–368. *Pl. 25–48, fig. 1–9.* 1919.—See Bot. Absts. 2, Entry 1264.

1285. Cook, Mel. T. **Potato spraying experiments in 1917.** New Jersey Agric. Exp. Sta. Rept. 1917: 561–563. 1918.—This paper is a record of spraying tests in three localities in the state in 1917. [See Bot. Absts. 2, Entries 504, 505.]—*M. T. Cook.*

1286. Darnell-Smith, G. P. **Fungous diseases of maize.** Dept. Agric. New South Wales Farmers' Bull. 116: 33–37. 1918.—The following diseases and the causal organisms are described briefly: ear rot (*Diplodia zeae*), American maize smut (*Ustilago zeae*), head smut (*Sorosporium reilianum*), rust (*Puccinia maydis*), leaf stripe (*Helminthosporium turcicum*).—*D. Reddick.*

1287. Dudley, F. H. **A few insects and diseases common to small fruits.** Maine Dept. Agric. Bull. 17^3: 22–27. 1918.

1288. Faulwetter, R. C. **The angular leaf spot of cotton.** South Carolina Agric. Exp. Sta. Bull. 198. *41 p., Pl. 1–6, charts 1–5.* 1919.—The disease, caused by *Bacterium malvacearum*, first appears as dark green angular spots on the under surface of the leaves. These later appear upon the upper surface and become reddish brown. The spots are bounded by the larger veins thus giving them their angular form. The seasonal history is divided into two phases, (1) the primary infections upon the cotyledons and (2) the secondary infections upon the foliage, leaves, stems, bracts and bolls. Of the factors concerned in the hibernation of the organism, the contamination of short lint or fuzz upon the seed plays a most important part. The amount of injury caused by this disease has not been fully determined, varying in different portions of the country. Wind during rain was found to be an important agent of dissemination.—Sterilization of the seed coat by the use of sulphuric acid and mercuric chlorid was found to be the most efficient means of control.—*D. B. Rosenkrans.*

1289. Federal Horticultural Board, U. S. Dept. Agric. **Banana plant quarantine (foreign).** Service and Regulatory Announcements 50: 33. 1918.—Exclusion of all varieties of banana plants (*Musa* spp.) or portions thereof from introduction into U. S. A. from the following countries: Jamaica, Trinidad, Dominica, Martinique, Guadeloupe, Barbados, Brazil, Philippine Islands, Fiji Islands, Sumatra, Java, Madagascar, Queensland, India, North Borneo, and British New Guinea.—Cause, root borer (*Cosmopolites sordidus*).—*D. Reddick.*

1290. Federal Horticultural Board, U. S. Dept. Agric. **Banana plant quarantine (domestic).** Service and Regulatory Announcements 50: 34. 1918.—Exclusion of all varieties of banana (*Musa* spp.) or parts thereof from the territories of Hawaii and Porto Rico. Cause, the weevils known as *Rhabdocenemis obscurus* and *Metamasius hemipterus*.—*D. Reddick.*

1291. Federal Horticultural Board, U. S. Dept. Agric. **Notice of quarantine No. 34—Bamboo quarantine.** Service and Regulatory Announcements 55: 82. 1918.—Movement of living seeds, plants or cuttings of all genera and species of the tribe Bambuseae into U. S. A. from all countries is prohibited. Cause, bamboo smut (*Ustilago shiraiana*) and other dangerous plant disease.—*D. Reddick.*

1292. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. **Potato wart in the United States.** Service and Regulatory Announcements 56: 90–91. 1918.—Potato wart (*Chrysophlyctis*) has been found in 26 mining towns of Pennsylvania. It was probably introduced on diseased stock imported in 1912. It has not been found in commercial potato-growing districts.—*D. Reddick.*

1293. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. **Quarantine on account of Japanese beetle.** Service and Regulatory Announcements 56: 91–92. 1918.—Sweet corn (*Zea*) from certain townships in the state of New Jersey is prohibited from interstate shipment in the United States, except after inspection and certification. Cause, Japanese beetle (*Popillia japonica*).—*D. Reddick.*

1294. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. Service and Regulatory Announcements 60: 17–27. 1919.—Notes on the following: Necessity of disinfection of railway cars which have been used for conveyance of fresh plant material; ballast [ship] as a possible means of introducing noxious insects and plants; memorandum concerning quarantine No. 37, restricting the importation of nursery stock and other plants and seeds after June 1, 1919, including a history of the steps leading up to the promulgation of the order and an account of the conditions which prompted it; notices of proposed hearings.—D. *Reddick.*

1295. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. Rept. Fed. Hortic. Bd. 1918, *19 p.* Washington, 1918.—Review of the activities of the board for the fiscal year. Data on importation and distribution of cotton, and nursery stock in U. S. A. List of current quarantines and other restrictive orders.—*D. Reddick.*

1296. HODGSON, C. M. **Spiked sandal wood.** Indian Forester 44: 66–71. 1918.—Referring only to the North Coimbatore Forest Division, author states: "I write to record my opinion that spike is not caused by fire, *Zizyphus*, lantana [*L. camara*] or any other feature of the environment but is an internal ailment due to some germ" or is a physiological peculiarity. Reasons for this belief are stated in some detail.—Observations on various ecological factors which were thought might have a bearing on the occurrence of the disease but none of which seems to have. [See also Bot. Absts. 2, Entries 1177, 1297, 1298, 1303, 1304 and 1307.]—*D. Reddick.*

1297. HOLE, R. S. **Spike disease of sandal.** Indian For. 44: 461–462. 1918.—Brief criticism of article by LUSHINGTON (Indian For. 44: 439. See Bot. Absts. 2, Entry 1177) and defense of author's position with respect to cause of spike disease, namely, that autogenetic origin of the disease is only a theory and not a "dictum." [See Bot. Absts. 2, Entries 1296, 1298, 1303, 1304 and 1307.]—*D. Reddick.*

1298. HOLE, R. S. **Spike disease of sandal.** Indian For. 44: 325–334. *Pl. 20–21.* 1918. —Rev. of article by VENKATARAMA AYYAR, Indian For. 44: 316–324, and defense of authors previous position, Indian For. 43: 430.—Spike disease probably was present long before 1898 but was brought prominently to notice at that time. *Zizyphus oenoplia* is found to be generally affected with a spike disease but its occurrence only lately has come to notice.—Isolation experiments by trenching should be allowed to continue for a longer period and finally it should be ascertained that roots of host plants have been excluded from the isolation areas.—Injury by fire was thought to be a factor only under dry, stony conditions.—Additional arguments based on observations are presented in favor of the theory of autogenetic origin of spike. [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1303, 1304 and 1307.]—*D. Reddick.*

1299. Lemée, E. **La rouille des poiriers (Roestelia cancellata) et le genévrier sabine. [The rust of pears and Juniperus sabina.]** Bull. Soc. Path. Vég. France 4: 96–97. 1918.—Instances are cited in which severe attacks of pear rust have been found in the neighborhood of Junipers and have been prevented by the removal of the Junipers. A plea is made for the compulsory destruction of this host in pear growing sections.—*C. L. Shear.*

1300. Lees, A. H. **Reversion of black currants.** Ann. Rept. Agric. and Hortic. Res. Sta. Univ. Bristol 1917: 33–34. [1918].—See Bot. Absts. 2, Entry 1074, of which this is said to be a brief.—*D. Reddick.*

1301. Lint, H. Clay. **Report of potato spraying experiments.** New Jersey Agric. Exp. Sta. Rept. 1916: 604–617. 1918.—Seven different treatments were used in four localities in the state and the results recorded with discussion.—*M. T. Cook.*

1302. Lint, H. Clay. **Report of the sulfur potato scab experiment for 1916.** New Jersey Agric. Exp. Sta. Rept. 1916: 618–625. 1918.—This work was carried on in six localities in the state and was for the purpose of determining the value of sulfur as a soil treatment in the control of the potato scab organism (*Actinomyces chromogenus*).—*M. T. Cook.*

1303. Lushington, P. M. **Progress of spike investigation in the southern circle, Madras Presidency, during 1917–18.**—Indian Forester 44: 439–460. *2 folded charts.* 1918.—Résumé of work by author (Indian Forester 44: 114) and by Venkatarama Ayyar, (Indian Forester 44: 316) with extensions and additions.—Investigations to date do not support the theory of unbalanced circulation of sap. Means of spread of the disease is not known but author believes evidence points to transmission of infection by means of such hosts as *Zizyphus oenoplia, Dodonaea viscosa, Argyreia cuneata, Cipadessa fruticosa,* rather than by birds, flying foxes, insects, red spider, etc. Seed seems to be free from disease.—In some localities the disease spreads from tree to tree, and progresses more rapidly in individual trees, than in other localities.—The disease may manifest itself every month of the year except August but the period March to July is most favorable for its appearance. It does not progress regularly from branch to branch. Its appearance is readily detected but there is no way of determining when the tree became infected. Meagre data indicate that the incubation period may be 19 months.—It is not possible to state that the preventive measures adopted have been of any use. [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1298, 1304 and 1307.]—*D. Reddick.*

1304. Lushington, P. M. **Spike disease in sandal. An interesting isolated area and its treatment.** Indian Forester 44: 114–117. 1918.—An area of 11 acres on the top of the Javadis, elevation 2800 feet, contained 65 diseased trees "one season old." This is 100 miles from any other known cases of the disease.—In October 1917 all sandal within the area and in a belt about one furlong in width was removed whether spiked or not, as were also the following plants, all of them subject to a spike-like disease: *Zizyphus oenoplia, Dodonaea viscosa, Scutia indica* and *Cipadessa fruticosa.* [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1298, 1303 and 1307.]—*D. Reddick.*

1305. McMurran, S. M. **Pecan rosette in relation to soil deficiencies.** U. S. Dept. Agric. Bull. 756. *11 p., 4 fig.* Washington, 1919.—Rosette is one of the most serious diseases of pecan in southeastern United States. Losses are incurred through reduced growth and decreased nut production. The disease, at first, is characterized by small, wrinkled, yellow-mottled leaves at the ends of branches; finally the tree dies back. There is also a shortening of internodes, and a forcing of dormant buds.—Empirical data indicated that a deficiency in humus, fertility and moisture supply has a causal connection with rosette. The present experimental work, conducted for the purpose of testing this view, extended over two years and involved the application of stable manure alone, cottonseed meal, alone, and combined with stable manure, and lime; check plats received no fertilizer. The first three fertilizers were very beneficial in restoring trees to a normal condition of growth, appearance and nut-production. Lime on the other hand failed to improve the rosetted trees; in fact they grew worse.—Injury to feeding roots by plowing apparently aggravates the disease.—Control suggestions are along the line of soil improvement. Develop deeper surface soils between rows of trees by use of cover crops, by plowing deeper year after year until 8 or 10 inches of fertile soil is established. New cuttings should not be made on deep sand, clays underlain by sand, or on eroded hillsides. The soil type selected should approach as nearly as possible that in which the pecan grows in its natural habitat. The beneficial results with manure and cottonseed meal, alone or combined, highly commend the use of such fertilizers for rosette. Many orchards have been planted on unsuitable soils; in such cases the author advises building up such soils rather than replanting in a new location. [See Bot. Absts. 2, Entry 1146.]—*L. R. Hesler.*

1306. POOLE, R. F. **Report of celery investigations.** New Jersey Agric. Exp. Sta. Rept. 1917: 536-539. 1918.—A continuation of the work carried on by W. S. Krout in 1916 and is primarily a record of the influence of a number of chemicals used for the control of pathogenic soil organisms (*Bacterium sp.* causing crown rot, *Sclerotinia libertiana* causing stem rot and nematodes).—*M. T. Cook.*

1307. RAO, RAMA. **Field investigations of spike disease in sandal on the Kollimalai hills.** Indian Forester 44: 58-65. 1918.—Spike disease was found in the hills 80 miles from previously known diseased plants, the two cases found being 8 miles apart. Detailed observations on the ecological conditions under which the disease was found and which allow of no definite conclusion, and a minute description of the appearance and condition of the diseased trees.—Author is skeptical of the contagious or infectious nature of the disease.—A list of 57 hosts of sandal tree on the Kollimalais is appended. [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1298, 1303 and 1304.]—*D. Reddick.*

1308. REINKING, OTTO A. **Philippine economic-plant diseases.** Philippine Jour. Sci. A, 13: 165-274. *43 fig., 22 pl.* 1918.—This paper describes the most important diseases found upon economic plants in Laguna and near provinces in Luzon, Philippine Islands; 339 diseases of 61 hosts are described. The hosts are arranged alphabetically, and diseases are described under each host. The description of each disease includes three topics: symptoms, causal organism, and control. Many of the diseases are described for the first time, only the fungi having been identified previously. Particularly important work was done with the following: *Phyllachora sorghi*, *Sclerotium*, *Rhizopus artocarpi*, *Pseudomonas citri*, *Rhizoctonia*, coconut bud-rot, *Hemileia vastatrix*, *Phytophthora colocasiae*, *Phytophthora nicotianae*, *Pythium debaryanum*, *Woroninella psophocarpi*, *Cercospora* sp. (on sugar cane), *Phytophthora faberi*, *Helminthosporium inconspicuum*, and *Sclerospora maydis*. A special section of the paper deals with the control of plant diseases; in this section are discussed plant sanitation, crop rotation, cultural methods, disease-resistant varieties, soil sterilization, and fungicides.—*S. F. Trelease.*

1309. SALMON, E. S., AND H. WORMALD. **An experiment in the treatment of covered smut of barley.** Jour. Bd. Agric. [London] 24: 1388-1394. *2 fig.* 1918.—The covered smut (*Ustilago hordei*) and loose smut (*U. nuda*) are briefly described. The presence of covered smut results in a depreciation of the grain due to the fact that maltsters claim to be unable to make pale ale from barley having much smut in it.—Experiments to control covered smut show that formalin dip is effective, sprinkling with copper sulfate (2.5 per cent solution) less effective, sprinkling with bordeaux mixture of little value and sweating on a malt kiln at 100°F. for 24 to 30 hours valueless.—*D. Reddick.*

1310. SHEAR, C. L. **Pathological problems in the distribution of perishable plant products.** —Mem. Brooklyn Bot. Gard. 1: 415-422. *Pl. 9-11.* 1918.—Examples are drawn from various sources to show the necessity for investigating the causes of and means of preventing deterioration and decay of plant products in transit, storage, and on the market.—The physiological behavior of decay-producing organisms, particularly with respect to temperature, humidity, etc., has an important bearing on determining responsibility for losses.—*D. Reddick.*

1311. Smith, Erwin F. **The relation of crown-gall to other overgrowths in plants.** Mem. Brooklyn Bot. Gard. 1: 448–453. 1918.—Outline of a lecture which is summed up by the author as follows: "My own belief is that all overgrowths are correlated phenomena, are the response of the organism to essentially similar (but not necessarily identical) stimuli, the visible difference in response when brought about by parasites being due to number and location of the parasites, age and kind of tissues invaded, and volume, direction, and velocity of the stimulus exerted. In other words, in every case, I think the stimulus is primarily a physical stimulus due to changed osmotic pressures rather than a direct chemical stimulus. Overgrowths, therefore, do not always involve the presence of a parasite although as observed in nature parasites are probably responsible for most of them."—*D. Reddick.*

1312. Stevens, Neil E., and R. B. Wilcox. **Further studies of the rots of strawberry fruits.** U. S. Dept. Agric. Bull. 686. *13 p. Tables 1–8.* 1918.—The studies were made in the field, en route and in markets. Two types of rot are discussed: rhizopus rot (caused by *Rhizopus nigricans*) and botrytis rot (caused by *Botrytis* sp., probably *B. cinerea*). The former, known as leak, is the most important fruit rot found on growing ripe strawberries. The latter is a field rot, being most serious under excessively moist conditions. Control of leak is closely connected with handling methods. Of prime importance is the avoidance of injury to the epidermis. Berries should be picked in the cool of the morning, packed before rather than after washing, and placed at a low temperature. Rhizopus grows very slowly at 10°. A practical hint in this connection is found in the fact that the greater amount of rot occurs when the longer time is consumed in reaching 10°C.; it is important that this temperature be reached as quickly as possible. Botrytis-decayed berries should not be packed with fruit intended for market. It is found that *Rhizopus* rarely ever follows *Botrytis*.—*L. R. Hesler.*

PHYSIOLOGY

B. M. Duggar, *Editor*

DIFFUSION, PERMEABILITY

1313. Hurd, Annie May. **The relation between the osmotic pressure of Nereocystis and the salinity of the water.** Publ. Puget Sound Biol. Sta. 2: 183–193. 1919.—As the water in which *Nereocystis* is grown is decreased in salinity the plant loses salts and takes in water, but maintains an average osmotic surplus of 3.62 atmospheres. In normal Puget Sound water with osmotic pressure of 19.2 atmospheres *Nereocystis* has an osmotic pressure of 22.72 atmospheres. The pressure within the plant was slowly lowered to 12.52 atmospheres without resulting in death, by reducing the water to 17/28 fresh. The plant can endure 100 per cent fresh water if the reduction of salt is gradual enough for the pressure within the cells to adjust itself to that outside, but not if the change is sudden.—*T. C. Frye.*

1314. Osterhout, W. J. V. **Decrease of permeability and antagonistic effect caused by bile salts.** Jour. Gen. Physiol. 1: 405–408, 1919.—The author finds that sodium taurocholate is able to produce a decrease in permeability and to antagonize NaCl; also, that, antagonistic relations can be predicted by finding the effect on permeability of each substance by itself, inasmuch as substances which decrease permeability antagonize those which increase it.—*J. M. Brannon.*

1315. Schryver, S. B., and N. E. Spear. **Investigations dealing with the state of aggregation. Part IV.—The flocculation of colloids by salts containing univalent organic ions.** Proc. Roy. Soc. London B, 90: 400–414. 1919.—With certain exceptions, in cases tested, no general relationship was found between the surface tensions of normal solutions and the capacity of salts to flocculate colloids.—*P. B. Sears.*

1316. Maze, P. **Recherche d' une solution purement minérale capable d' assurer l'evolution complète du mais cultivé à l'abai des microbes. [Investigation of a purely mineral solution capable of insuring the complete development of cultivated maize protected from microbes.]** Ann. Inst. Pasteur 33: 139–173. *Fig. 1–8.* 1919.—The influence of dilute solutions of aluminium, boron, iodin, fluorin and arsenic, in the form of salts, upon the development of maize was studied by growing the plants in a pure mineral salt solution. The latter contained nitrogen, phosphorus, potassium, sulphur, calcium, magnesium, iron, silicon, zinc, manganese and sodium ($NaNO_3$, KH_2PO_4 and K_2HPO_4, $MgSO_4$, $CaCO_3$, $FeSO_4$, K_2SiO_3, $ZnCl_2$, and $MnCl_2$). Minimum quantities of boron, aluminium, fluorin, and iodin were found to be indispensable to the growth of maize, the degree of usefulness being in the order named. Arsenic was found to be of no value.—Similar studies were made of the effect of different organic salts and humus compounds when added to the above pure mineral salt solution. In the early period of growth, these appeared to exert some influence, whereas at the end of the experiment no appreciable effect could be noted. Further experiments were carried on to determine the influence of aeration and the state of oxidation of the iron compounds upon the progress of growth.—*Walter G. Sackett.*

METABOLISM (NITROGEN RELATIONS)

1317. Bonazzi, Augusto. **On nitrification. II. Intensive nitrite formation in solution.** Jour. Bact. 4: 43–60. *Pl. 1, fig. 1–2.* 1919.—By the use of Fernback flasks having a surface bottom of approximately 300 square centimeters, adjusted to a slowly revolving klinostat placed at an angle of about 5 degrees from the vertical, a very luxuriant growth of nitrite-forming bacteria was produced in the Omelianski solution. The growth of these organisms is reported by the author to be far in excess of any yet recorded for equal periods of time in solution cultures. Better aeration and a change of local environment by removal of by-products, or of better access of mineral nutrients, are suggested as the factors contributing to intensive nitrification.—*Chester A. Darling.*

1318. Brewster, J. F., and C. L. Alsberg. **Determination of the distribution of nitrogen in certain seeds.** Jour. Biol. Chem. 37: 367–371. 1919.—Analyses of cottonseed flour, tomato seed (pressed), cow pea (*Vigna sinensis*), jack bean (*Canavalia ensiformis*), corn (*Zea mays*), corn germ (pressed), wheat, Kafir corn (*Andropogon sorghum*) and kafarin were made by the Van Slyke method to determine the amount of nitrogen present in various forms (amide N, humin N, arginine N, histidine N, cystine N, lycine N, and amino N). The results agree in general with those obtained by other workers. Determinations of the nitrogen distribution in the nucleic acid of yeast were also made. Fifteen per cent. of the total nitrogen of the acid appears in the arginine fractions, although the nucleic acid contains no arginine. Erroneous results may be obtained by using the Van Slyke method on materials containing nucleic acid.—*George B. Rigg.*

1319. Temple, J. C. **The value of ammonification tests.** Georgia Agric. Exp. Sta. Bull. 126. *18 p.* 1919.

GROWTH, DEVELOPMENT, REPRODUCTION

1320. Bose, J. C., and G. Das. **Researches on growth and movement in plants by means of the high magnification crescrograph.** Proc. Roy. Soc. London B, 90: 364–400. *Fig. 1–17.* 1919.—Author describes a self-recording growth-meter with maximum magnification of growth-changes up to 10,000.—By means of delicate experiments of short duration exact reactions of plants to various stimuli were ascertained. Growth and nastic and tropic (including pulvinal) reactions were shown to have a definite homologous basis. The direct application of a stimulus induces contraction; while indirect application, i.e., upon a region distant from the point of response, gives rise to expansion. Unilateral stimulation causes positive curvature by contraction of the proximal side (direct effect) and expansion of distal side (indirect effect), e.g., in a growing stem. Transverse conduction of excitation induces contraction of the opposite side, neutralizing or reversing the positive responsive curvature; that is, if the stimulus be strong enough it travels through protoplasm to a region where the indirect effect has already appeared, neutralizing the latter by establishing a direct, or contractive, effect. Cases of differential excitability in two halves of anisotropic organs were considered.—*P. B. Sears.*

TEMPERATURE RELATIONS

1321. BURGESS, JAMES L. **Relation of varying degrees of heat to the viability of seeds.** Jour. Amer. Soc. Agron. 11: 118–120. 1919.—In an investigation of means of destroying insect pests in stored seed, it was found that a temperature of 140° to 158° F. continued through 5 hours had no appreciable detrimental effect on the viability of garden beans. Cow peas were almost killed at 194° during a period of 5 hours, while their viability was unaffected at 140° for 1 hour. Soybeans were unaffected at 140°–194° through periods of 1, 3 and 5 hours. A temperature of 176° to 212° for 5 hours did not affect the viability of rye, while 230° for 2 hours reduced the viability 78 per cent. The viability of wheat was reduced 60 per cent at a temperature of 230° for 1 hour.—*J. J. Skinner.*

1322. HAMILTON, HERBERT C. **Digitalis leaves: effect on activity of temperature in drying.** Jour. Amer. Chem. Soc. 41: 125–130. 1919.

MISCELLANEOUS

1323. FAULWETTER, R. C. **The angular leaf spot of cotton.** South Carolina Agric. Exp. Sta. Bull. 198. *41 p. Pl. 1–6, charts* 1–5. 1919.—See Bot. Absts. 2, Entry 1288.

1324. KOCH, G. P., AND J. R. BUTLER. **Cross-inoculation of legumes.** Soil Sci. 6: 397–403. 1918. See Bot. Absts. 3, Entry 362.

SOIL SCIENCE

J. J. SKINNER, *Editor*

1325. ANONYMOUS. **Kelp potash production.** Pacific Fisherman 17: 64. 1919. Note on amount produced.—*T. C. Frye.*

1326. ANONYMOUS. **Hercules kelp plant may continue.** Pacific Fisherman 17: 46. 1919. —Note.—*T. C. Frye.*

1327. ANONYMOUS. **California kelp fleet sold.** Pacific Fisherman 17: 52. 1919.—Note on probable activity in the kelp industry.—*T. C. Frye.*

1328. BECKWITH, CHARLES S. **Report on cranberry investigations for the season of 1918.** Proc. Ann. Meet. Amer. Cranberry Growers' Assoc. 49: 3–15. *Pl. 1–6.* 1919.—See Bot. Absts. 2, Entry 1262.

1329. BONAZZI, AUGUSTO. **On nitrification. II. Intensive nitrite formation in solution.** Jour. Bact. 4: 43–60. *Pl. 1, fig. 1–8.* 1919.—See Bot. Absts. 2, Entry 1317.

1330. BROWN, P. E., AND D. R. JOHNSON. **Effects of certain alkali salts on ammonification.** Iowa Agric. Exp. Sta. Res. Bull. 44. 1918.—The effect of the salts, Na_2CO_3, $NaHCO_3$, Na_2SO_4 and NaCl, on ammonification in the presence and in the absence of $CaCO_3$ was studied. $CaCO_3$ when used alone exerted a marked beneficial influence on ammonification. The greatest effect occurred with 0.3 per cent, but up to 5 per cent no decrease occurred. With Na_2CO_3 a stimulating effect was observed at a concentration of 0.1 per cent; with $NaHCO_3$ at 0.05 per cent; with Na_2SO_4 at 0.1 per cent; and with NaCl at 0.005 per cent. Increased additions of these salts, however, failed to stimulate the ammonifiers but on the contrary retarded their action. For the soil used the point of toxicity was between 0.1 per cent and

0.2 per cent for Na_2CO_3; between 0.05 per cent and 0.1 per cent for $NaHCO_3$; between 0.1 per cent and 0.5 per cent for Na_2SO_4; and between 0.005 per cent and 0.01 per cent for NaCl. Increasing additions of all these salts brought about gradually increasing depressions in ammonification. When $CaCO_3$ was used with these salts it was found to reduce their toxicity to a considerable extent in every case, and in some instances made the toxic amounts of the salts actually stimulative to ammonification. Various combinations of the alkaline salts exhibited a greater toxic effect than the same salts in the same concentration exhibited individually.—*W. H. Ross.*

1331. DAVIDSON, J. **Do seedlings reduce nitrates?** Jour. Biol. Chem. 37: 143–148. 1919.—See Bot. Absts. 2, Entry 168.

1332. FRED, E. B. **The effect of certain organic substances on seed germination.** Soil Sci. 6: 333–349. *Pl. 1–4.* 1918.—Casein, powdered alfalfa, and peptone do not seriously injure seed germination in the soil unless used in large quantities (0.5 per cent or more). Calcium carbonate does not lessen the injurious effect on germination of large applications of alfalfa powder or casein. Sugar (about 1 per cent) added to the soil retards seed germination. In large amounts it decreases the percentage of germination. The retarding action of sugar on the germination of seeds is perhaps due to the large amount of carbon dioxide given off in the decomposition of the sugars.—*W. J. Robbins.*

1333. HARTWELL, B. L., AND F. R. PEMBER. **The presence of aluminum as a reason for the difference in the effect of so-called acid soils on barley and rye.** Soil Sci. 6: 259–279. *Pl. 1.* 1918.—The reason why acid soils are more harmful to barley than rye was investigated. Substances found to affect rye and barley about alike were sterilized soil, acid in nutrient solution, hydrogen peroxide, dihydroxystearic acid, manure extract, ammonium sulfate, potassium permanganate, chromium and silicon. Aluminum sulfate was more toxic to barley than rye. An examination of the aqueous extract of the acid soil used proved aluminum to be the element responsible for the different influence on the plants. Treatment of an acid soil with acid phosphate reduced the amount of active aluminum in the soil and caused remarkable growths of plants so sensitive to an untreated soil that previously no growth was possible. The results indicate that the practical advantage of phosphating and liming may often prove to be due to the precipitation of active aluminum quite as much as to supplying phosphorus as a nutrient and lime as a reducer of acidity. [See Bot. Absts. 2, Entry 1137.]—*W. J. Robbins.*

1334. McCOOL, M. M., AND C. E. MILLER. **Soluble salt content of soils and some factors affecting it.** Michigan Agric. Exp. Sta. Tech. Bull. 43. *47 p.* 1918. It is shown that the translocation of salts in the soil is due mainly to water movements. When large quantities of salt are present there is a movement to areas of lower concentration even when water movements are prevented. The accumulation of soluble salts on the surface of uncropped areas indicate that when water movements occur in the soil, salts are carried along with it. That these movements do not take place to any great depth is evidenced by the results of various investigations showing but little movement of water from the subsoil to the feeding zone of the roots. It is considered improbable that any great quantity of soluble material is supplied to the plants from depths below those of root penetration. The quantity of soluble salts in greenhouse soils may become too great for proper plant development, and in certain muck soils plant growth may be inhibited by the accumulation of soluble substances in the upper layers. Experiments made with corn and barley cultures show that plants may materially reduce the soluble salt content of the soil. Field experiments also gave evidence in the same direction, but to a less marked degree. As a result of laboratory experiments it would appear further that the constituents of soils which have been cropped for a long period of years go into solution at a somewhat slower rate than do those of the corresponding virgin soils. The rate of solution in the case of the soils studied is governed to some extent by temperature, it being more rapid at 25° than at temperatures approaching 0°. The mo isture content, moreover, has a marked influence on the rate of solubility of the soil constituents, and it is pointed out that biological activities probably play an important rôle in these phenomena. A seasonal variation in the salt content of field soils was shown by an examination of several soil classes at different periods during the spring and summer months. In the case of all the mineral soils tested, there was noted a tendency for the soil solution to reach a maximum concentration in the early summer when plant growth is at a maximum.—*W. H. Ross.*

1335. Potter, R. S., and R. S. Snyder. **The organic phosphorus of soil.** Soil Sci. 6: 321–332. 1918.—The authors test a method previously described of determining organic phosphorus in the soil. By comparing the hydrolysis curves of phytin and nucleic acid with the hydrolysis curves of the organic phosphorus in three soils they conclude that nucleic acid was not present but phytin or a pyrmidine nucleotide may have been present. [See Bot. Absts. 2, Entry 1123.]—*W. J. Robbins.*

1336. Richardson, A. E. V. **Agriculture. America and Australia compared.** Jour. Dept. Agric. Victoria 17: 1–20. 1919.

1337. Schryver, S. B., and N. E. Spear. **Investigations dealing with the state of aggregation. Part IV.—The flocculation of colloids by salts containing univalent organic ions.** Proc. Roy. Soc. London B, 90: 400–414. 1919.—See Bot. Absts. 2, Entry 1315.

1338. Stewart, Robert, and F. A. Wyatt. **Limestone action on acid soils.** Illinois Agric. Exp. Sta. Bull. 212: 267–296. 1919.—For the common prairie land of southern Illinois an application of 1 ton per acre of limestone once in 3 or 4 years is sufficient to keep the soil alkaline, after the initial acidity has been destroyed by heavier applications. Dolomitic limestones can be used successfully on acid soils. It is slightly more effective than high-Ca limestone in neutralizing the soil acidity, is more durable, and has no injurious effects. Limestone applied to the surface slowly penetrates into the subsurface, but does not seem to have any effect upon the acidity of the subsoil. The amount of native limestone found in the subsoil is a variable quantity. In some cases there is none present even at a depth of 40 inches, whereas in other cases it extends upward even slightly into the subsurface. The results indicate that chemical analysis may be depended upon to measure the acidity of the soil, the reduction of activity due to the action of limestone applied, and also to find the limestone still remaining in the soil.—*W. H. Ross.*

1339. Tottingham, W. E. **A preliminary study of the influence of chlorides on the growth of certain agricultural plants.** Jour. Amer. Soc. Agron. 11: 1–32. 1919.—See Bot. Absts. 2, Entry 817.

1340. Turrentine, J. W. **Progress of the kelp potash industry.** Pacific Fisherman Year Book 1919: 111.—General condition of the industry on the Pacific Coast. A general statement of the work of the experimental plant of the U. S. Bureau of Soils at Summerland, California.—*T. C. Frye.*

1341. Van Alstine, E. **The movement of plant food within the soil.** Soil Sci. 6: 281–308. 1918.—Analyses were made of the amount of phosphorus, calcium, magnesium, nitrogen, potassium, organic carbon and limestone in samples of soil from the surface 3 inches and two strata below the surface of fertilized and unfertilized plots under treatment for 54 years at Rothamsted, England. Analyses were also made of the phosphorus in samples from fertilized and unfertilized plots under treatment since 1882 at State College, Pa., and from plots which have been treated for 20 years at Strongsville, Ohio. The author concludes that when phosphorus is used as a fertilizer it remains almost where it is placed in the soil until removed in crops or by some process like erosion. The addition of alkali salts (sulfates of potash, soda and magnesia) seems to encourage the utilization of phosphorus by legumes. Loss of nitrogen through drainage is very small when crops are kept on the ground through the growing season. Potassium though easily and quickly fixed in the soil is subject to movement within the soil as a result of fertilizing with other salts. The loss of Mg is brought about by the use of ammonium salts. Ammonium salts also increase the loss of Ca from the soil. A review of the literature is given.—*W. J. Robbins.*

1342. WAKSMAN, SELMAN A., AND ROLAND E. CURTIS. **The occurrence of actinomycetes in the soil.** Soil Sci. 6: 309–319. 1918.—The number of bacteria developing on an albumen agar at 25°C. in 3 days was compared with the number of actinomycetes developing at the same temperature in 14 days from 25 soils of North America and the Hawaiian Islands. The per cent. of actinomycetes varied from 3.5 to 46.0 per cent. with an average of 17 per cent. The soils higher in undecomposed organic matter gave the larger per cent. of actinomycetes colonies. By isolation of the actinomycetes and separation into types some were found to be of general distribution.—*W. J. Robbins.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

SPERMATOPHYTES

1343. ANONYMOUS. **Diagnoses Africanae. LXXI.** Bull. Misc. Inf. Kew 1918: 202–207. 1918.—This article contains descriptions of the following plants new to science: *Raphidiocystis ugandensis* Rolfe, *Salvadora angustifolia* Turrill, **Apterantha** C. H. Wright (a new genus of the Amarantaceae), *A. oligomeroides* C. H. Wright, *Loranthus aldabrensis* Turrill, *Phyllanthus Cheloniphorbe, Cluytiandra peltata, C. Baronii, Acalypha claoxyloides, A. Fryeri* Hutchinson, and *Widdringtonia dracomontana* Stapf.—*J. M. Greenman.*

1344. BENNETT, ARTHUR. **Notes on British Potamogetons.** Jour. of Bot. 57: 10–20. 1919.—Notes "suggested by a perusal of Herr Hagstrom's Critical Researches on the genus" (Jour. Bot. 55: 115. 1917.) Brief notes on nomenclature, morphology, taxonomy, and distribution. Thirty-eight species and several varieties are treated, several of which are found also in America. The nomenclature of some American species is affected.—*K. M. Wiegand.*

1345. BOULGER, G. S. **Juncus acutus L.: a correction.** Jour. of Bot. 57: 21. 1919.—The plant reported from the Andrews Herbarium as this is really *J. glaucus.*—*K. M. Wiegand.*

1346. BROADWAY, W. E. **The wild orchids of Tobago.** Bull. Dept. Agric. Trinidad and Tobago 17: 95–100. 1918.—List of 52 species.—*D. Reddick.*

1347. CRAIB, W. G. **Contributions to the flora of Siam. Additamentum X.** Bull. Misc. Inf. Kew 1918: 362–371. 1918.—The following flowering plants are described as new to science: *Evodia glomerata, Gynostemma siamaca, Schefflera siamensis, Lysimachia lancifolia,* **Damrongia** (a new genus of the Gesneriaceae), *D. purpureo-lineata, Petrocosmea Kerrii, Ruellia bella, Asystasia salicifolia, Vitex Pierrei, Elsholtzia Winitiana, Croton siamensis, Dalechampia elongata, Celtis Collinsae,* and *Gironniera longifolia.*—*J. M. Greenman.*

1348. FAWCETT, WILLIAM, AND A. B. RENDLE. **Notes on Jamaica plants.** Jour. Bot. 57: 65–68. 1919.—[Continued from Jour. Bot. 55: 271. 1917.] Euphorbiaceae discussed; the following species described as new: *Phyllanthus* (sect. *Euphyllanthus*) *minor, P.* (sect. *Xylophylla*) *inaequaliflorus,* and *P.* (sect. *Xylophylla*) *Coxianus.* Critical notes on several other species are given. One new combination, *P. glabellus* (L.), is made.—*K. M. Wiegand.*

1349. GAGNEPAIN, F. **Lagerstroemia nouveaux d'Indo-Chine. [New Lagerstroemias from Indo-China.]** Not. Syst. 3: 355–363. Dec. 30, 1918.—The following new species are described: *Lagerstroemia angustifolia, L. cochinchinensis, L. crispa, L. Duperreana, L. petiolaris* Pierre, *L. corniculata, L. glabra, L. Lecomtei, L. siamica, L. Spireana,* and *L. Thorelii* Gagnep.—*J. M. Greenman.*

1350. Gagnepain, F. **Quelques Illigera nouveaux.** [Some new Illigeras]. Not. Syst. 3: 363–366. Dec. 30, 1918.—The following new species of China are described: *Illigera Fordii*, *I. glandulosa*, *I. Pierrei*, and *I. Thorelii*.—*J. M. Greenman.*

1351. Gagnepain, F. **Deux Gisekia et Mollugo nouveaux d'Indo-Chine.** Not. Syst. 3: 367–368. Dec. 30, 1918.—The author describes *Gisekia Pierrei* and *Mollugo herniarioides* as new species from China.—*J. M. Greenman.*

1352. Gagnepain, F. **Seconde espèce, Tonkinoise, d'un genre monotype Chinois: Carrierea Vieillardii Gagnep. [A second species from Tonkin of a monotypic Chinese genus: Carrierea Vieillardii Gagnep.]** Not. Syst. 3: 368–371. *Fig. 1–6.* Dec. 30, 1918.—The species mentioned in the title is described and illustrated, as new to science; it was collected in the province of Tonkin, China, and is dedicated to M. Vieillard, inspector of agriculture at Hanoi. —*J. M. Greenman.*

1353. Gagnepain, F. **Quelques Barringtonia nouveaux. [Some new Barringtonias.]** Not. Syst. 3: 383–385. Dec. 30, 1918.—Four new species are described from China, namely *Barringtonia annamica*, *B. comosa*, *B. longipes*, and *B. micrantha*.—*J. M. Greenman.*

1354. Koorders, S. H. **Abbildung und Beschreibung von Crateriphytum moluccanum Scheffer. [Illustration and description of Crateriphytum moluccanum Scheffer.]** *8 p., double table (1 a, 1 b).* Privately printed: Batavia (Java), Jan. 31, 1919.—A detailed description of the genus and the first published description of the species. The genus, a monotypic one from Amboina, is shown to be allied to *Couthovia* of the Loganiaceae.—*E. D. Merrill.*

1355. Maiden, J. H. **A critical revision of the genus Eucalyptus.** Vol. IV, Part 6. *P. 137–177., Pl. 148–151.* William Applegate Gullick: Sydney, 1919.—Seven species and several varieties are described and illustrated, namely, *Eucalyptus occidentalis* Endlicher with four varieties one of which is new, *E. macrandra* F. v. M., *E. salubris* F. v. M. with one new variety, *E. cladocalyx* F. v. M., *E. Cooperiana* F. v. M., *E. intertexta* R. T. Baker, and *E. confluens* (Fitzgerald) Maiden.—*J. M. Greenman.*

1356. Mott, F. Blount. **Impatiens glanduliferum Royle.** Jour. Bot. 57: 69. 1919. —Record of its occurrence near Peterson, Wales?—*K. M. Wiegand.*

1357. Nelson, J. C. **The name Toxylon again.** Amer. Bot. 25: 21–23. 1919.—The generic name of the Osage Orange is shown to have been originally published by Rafinesque as *Ioxylon*, later changed by him to *Joxylon* and still later to *Toxylon*. The specific name was originally *pomiferum* but with the final change in the generic name Nuttall's *aurantiacum* was used.—*W. N. Clute.*

1358. Osterhout, Geo. E. **Additions to the flora of Colorado.** Bull. Torrey Bot. Club 46: 53–56. 1919.—The following new species are described: *Nuttallia hastata*, *Phacelia formosula*, *Oreocarya monosperma*, *Mertensia Clokeyi*, and *Agoseris frondifera*.—*P. A. Munz.*

1359. Pennell, Francis W. **Concerning duplicate types.** Torreya 19: 13–14. 1919.—In place of the expression "duplicate type," defined by Hitchcock (Science 21: 832) as "a specimen of the same series or set as the type as indicated by the number or other data," the term *isotype* is proposed.—*J. C. Nelson.*

1360. Pennell, Francis W. **Some remarks upon Limosella.** Torreya 19: 30–32. 1919. —*Limosella aquatica* L. of the Rocky Mountain region and *L. subulata* Ives are described and contrasted. The Rocky Mountain plant cannot be distinguished from that of Eurasia. *L. aquatica* is the most widely distributed member of the Scrophulariaceae, and occurs on all the continents. The deviations are mostly slight and remote; but it has "thrown off" suggestively parallel species, of which *L. subulata* may possibly be closely duplicated in the Vancouver Island region and in Argentina. *L. subulata* has been studied from a colony about

Old Sams Pond, Point Pleasant, New Jersey. Specimens from this and other from water ponds along the Atlantic coast are partially though not constantly recognizable from those of saline habitats. The range of *L. subulata* must be extended southward to Chesapeake Bay. The more southern plants are coarser, usually with wider and longer leaves than the typical New England form. While primarily a plant of brackish soil, it is fully able to meet a non-saline environment.—*J. C. Nelson.*

1361. SPENCE, MAGNUS. **Juncus effusus spiralis.** Jour. Bot. 57: 69. 1919.—Record of its occurrence in Orkney.—*K. M. Wiegand.*

1362. STAPF, OTTO. **Gramineae. Flora of Tropical Africa 9:** (part 2) 193–384. 1918.—Part 1, which appeared in 1917, carried the account of the grasses through the Andropogoneae as far as the genus *Schizachyrium.* Part 2 is a continuation of this tribe as far as the genus *Exotheca.* The key to genera in part one shows that there are still seven genera of Andropogoneae to appear. The subgenera of Hackel are given generic rank by Stapf, such as, *Sorghum, Chrysopogon, Amphilophis, Dichanthium, Schizachyrium, Cymbopogon,* and *Heteropogon.* The keys and descriptions are unusually ample. The citations are not only of synonyms but also of the bibliography of each name. Specimens are fully listed. The new species in this part are distributed as follows: *Schizachyrium* 4, *Andropogon* 12, *Cymbopogon* 2, *Hyparrhenia* 16.—*A. S. Hitchcock.*

1363. TURRILL, W. B. **Contributions to the flora of Macedonia. I.** Bull. Misc. Inf. Kew 1918: 249–341. 1918.—The present paper "is based on collections made, in their spare time, by men engaged on active service with the British Salonika Forces." The region concerned is primarily that between Salonika and the Struma Plain and Krusa Balkan. An account of the topography, geology, meterology, and ecology precedes a systematic enumeration of the plants collected. Only spermatophytes and ferns are recorded; the list includes 625 species and varieties. The following are new: *Silene Harrisii, Viscia grandiflora* Scop. var. *sordida* Griseb. mutant *dissecta, Saxifraga graeca* Boiss. & Heldr. var. *Russellii, Jurinea arachnoidea* Bge. forma *integrifolia,* and *Campanula Spruneriana* Hmpe. var. *lepidota.*—*J. M. Greenman.*

1364. VAN SLOOTEN, D. F. **Bijdrage tot de kennis der Combretaceen en Flacourtiaceën van Nederlandsch-Indie. [Contribution to the knowledge of the Combretaceae and Flacourtiaceae of the Dutch-Indies.]** 8vo. *170 p. Pl. 1–2. Index.* A. Oosthoek. Utrecht. 1919.—The author presents a synoptical revision of these two families as represented in the Dutch East Indies. The following new species and varieties are described: *Terminalia Soembawana, T. borneensis, T. longespicata, Combretum glandulosum, Quisqualis sulcata, Q. sulcata* var. *subcordata* of the Combretaceae and *Hydnocarpus pentagyna, Taraktogenos polypetala, Ryparosa borneensis, Homalium novoguineense, Flacourtia Zippelii,* and *F. lancleolata* of the Flacourtiaceae.—*J. M. Greenman.*

1365. WILLIAMS, KATHERINE A. **A botanical study of skunk-cabbage, Symplocarpus foetidus.** Torreya 19: 21–29. *Pl. 1–2, fig. 1–13.* 1919.—See Bot. Absts. 2, Entry 981.

1366. WILLIS, J. C. **The flora of Stewart Island (New Zealand): a study in taxonomic distribution.** Ann. Bot. 33: 23–46. *2 fig.* 1919.

PTERIDOPHYTES

1367. KILLIP, ELLSWORTH P. **Fern hunting in Panama.** Amer. Fern. Jour. 9: 5–17. 1919.

1368. MACCAUGHEY, VAUGHAN. **The Pala or Mule's-Foot Fern (Marattia Douglasii (Presl) Baker) in the Hawaiian Archipelago.** Torreya 19: 1–8. 1919.—See Bot. Absts. 2, Entry 979.

1369. MAXON, WILLIAM R. **Notes on American Ferns. XIII.** Amer. Fern Jour. 9: 1–5. 1919.—The author lists seven species of ferns, the range of which has been extended. The distinguishing characters of *Cheilanthes Eatoni* Baker and *C. tomentosa* Link are contrasted.—*F. C. Anderson.*

1370. PALMER, ERNEST J. **Texas Pteridophyta.** I. Amer. Fern Jour. 9: 17–22. 1919.—The author presents a list of thirteen species with habitat and localities, a number of which are new for some of the species. One species, *Lycopodium adpressum* (Chapm.) Lloyd & Undw., is probably new for the state.—*F. C. Anderson.*

1371. PFEIFFER, NORMA E. **Queer Quillworts.** Quart. Jour. Univ. North Dakota. 9: 235–244. *1 pl.* 1919.—Quillworts are carefully described in a popular article, in the hope that botanists and casual collectors may be familiarized with the forms, and stimulated to look for species in the Dakotas. Reasons for their obscurity and their unpopularity with the collector are emphasized. A brief historical summary, and the geographic distribution and habitat of *Isoetes* are given.—*Wanda Weniger.*

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